Ontario

Annual Report on Forest Management 1996/1997

FOREST INFORMATION SERIES

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Annual Report on Forest Management

For the year April 1, 1996 to March 31, 1997

Ontario

Minister of Natural Resources of
the Province of Ontario

To her Honour
The Lieutenant-Governor of the
Province of Ontario

May it please your Honour

The undersigned begs respectfully to present to your Honour the Annual Report on Forest Management for the fiscal year beginning April 1, 1996 and ending March 31, 1997.

John C. Snobelen
Minister

October, 2000

Ontario

Annual Report on Forest Management 1996 / 1997

FOREST INFORMATION SERIES

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In 1994, the Environmental Assessment Board in Ontario issued its decision on the Ministry of Natural Resources' Class Environmental Assessment for Timber Management on Crown Lands in Ontario.

The EA Board's decision approved the timber management process MNR described to the board with 115 binding terms and conditions. One of these conditions requires MNR to make an annual report on Forest Management to the Legislature. This is the second such annual report.

This report is for the year 1996/97 but because of the time period when data was collected, some of the information refers to 1995/96.

MNR's forest management planning process has been undergoing significant improvements in recent years. The Crown Forest Sustainability Act (CFSA), which came into effect in 1995, requires anyone operating in a Crown forest in Ontario to ensure the long-term health of the forest so that all the benefits of Crown forests are available to future generations.

MNR has instituted changes affecting the responsibilities of the forest industry, the opportunities for the general public to become involved in forest management planning, the system for licensing forest companies, the fees paid to harvest wood, and funding for forest renewal, which is now stabilized through mechanisms that provide dedicated funding for renewal.

Ontario's inventoried land covers about 61.5 million hectares, with 40.3 million hectares classed as productive forested lands. The productive forested land on Crown land covers about 34.1 million hectares, with 26 million hectares of this area eligible for forestry activities. The focus of this annual report is providing information on the activities on this 26 million hectares. This area is referred to as the Area of the Undertaking in the Environmental Assessment Board's Decision.

The Area of the Undertaking is now divided into 68 management units. The CFSA requires that an approved forest management plan be in place for each management unit before any forestry operations may take place. A forest management plan covers a 20-year period and describes all the

values of the forest in a management unit, and the harvesting, renewal and other forestry-related activities that will take place. A forest management plan is renewed every five years through a process that provides opportunities for public input. In 1996, 1997, 1998, 1999, 63 forest management plans and contingency plans were approved and implemented.

The CFSA provides for two types of licences: Forest Resource Licences and Sustainable Forest Licences. In 1996/97, MNR issued a total of 4,489 licences covering a total of 24,187,600 hectares of productive forest area.

Figures for total harvest by area and volume used in this report are from 1995/96 because data collection on harvesting and other disturbances is not completed until late in a given year. In 1995/96, harvesting activities took place on 213,235 hectares. A total of 21,674,483 cubic metres of wood was harvested within the Area of the Undertaking. Forest fires occurred on a further 189,885 hectares of productive forest.

The CFSA requires a significant portion of the money paid by forest companies to be designated exclusively for forest renewal activities. In 1996/97, the Government of Ontario received a total of $217,184,100 for wood harvested, of which $94,245,400 was deposited in to funds designated for the maintenance and renewal of the forest, and for work associated with ensuring the future of the forest. In the same period, a total of $83,800,000 was spent on forest renewal activities.

Regeneration of the forest occurs both naturally and with assistance. In 1996/97, there was natural regeneration on 83,091 hectares of land. Assisted regeneration occurred on 97,041 hectares. Site preparation activities, such as by mechanical means, chemical spraying, and prescribed burning, took place on another 83,630 hectares. In total, renewal activities were carried out on 282,107 hectares of productive forest.

Tending and protection activities were conducted to improve the quality and growth of some areas of the forest. During 1996/97, tending and protection activities such as thinning and pest control were carried out on 120, 549 hectares of forest.

Forestry operations require a complex system of primary and secondary roads, the cost of which is now borne by forest companies. In 1996/97, 1,088 kilometres of primary and secondary road were constructed in Ontario forests to serve management activities. Maintenance work was done on another 11,764 kilometres of road.

This report discusses the efforts of MNR and First Nations communities in 21 MNR districts to respond to term and condition #77 of the Timber Class EA decision and implement ways of achieving a more equal participation by Aboriginal peoples in the benefits of forest management.

MNR is responsible for monitoring compliance with forest management plans and standards. During 1996/97, 3,506 inspection reports were submitted which reported 43 infractions that resulted in penalties.

All management units are audited at least once every five years. In 1996 Independent Forest Audits were conducted on four Sustainable Forest Licence Units: Black Sturgeon Forest, Black River Forest, Spruce River Forest and the Lake Nipigon Forest. In all four cases the auditors recommended or were in support of licence renewal.

Part of MNR's monitoring responsibilities includes assessing the impacts of forestry activities on the forest ecosystem over the long term. Chapter 10 of this report details research and scientific studies that MNR is undertaking to ensure that the data and methodologies are available to monitor and manage effectively.

Chapter 1

Management of Ontario's forests has evolved through past decades from managing for timber to managing for all the values of the forest. With the introduction of the Crown Forest Sustainability Act (CFSA) in 1995, Ontario adopted a policy of managing Crown forests according to the principle of sustainability; that is, to conserve large, healthy, diverse, and productive forests and their associated ecological processes and biological diversity.

Forest management has also been guided by the Environmental Assessment Act. In 1988, the Environmental Assessment (EA) Board began an assessment of the Crown land timber management planning process of the Ministry of Natural Resources (MNR), which is responsible for forest management in Ontario. Six years later, after extensive public hearings, the Board released its decision on MNR's Class Environmental Assessment for Timber Management on Crown Lands in Ontario for a large part of the province, referred to as the Area of the Undertaking (AOU). The EA Board approved MNR's planning process for Crown forests with 115 terms and conditions. One of the conditions is that MNR prepare an annual report that provides the legislature and the public with information on Ontario's Crown forests.

This document is the second such annual report and covers the period 1996/97. However, the information on disturbances, such as harvesting, forest fires, and insects, is from 1995/96, because this material is mapped and inventoried in the fall of the year in which it occurred, to allow time to complete the gathering of information. The gathering of information on disturbances is completed too late in any given year for the data to be included in a report on activities during that same year. New data, information, errors or omissions noted since the last report have also been addressed in this report.

For management purposes, Ontario's Crown forests are now divided into 68 management units, each of which is managed according to its own 20-year forest management plan. Each plan is renewed every five years

through a process established in law. This Report is both an introduction to the new forest management planning process and a report on the most recent harvesting and renewal activities for the forest as a whole. The Report includes a list of forest management plans in various stages of development that were implemented in 1996, 1997, 1998, 1999 after approval.

There is an overview of the new licensing and revenue-generating system for forest management activities. This Report also presents information about term and condition #77 of the Timber Class EA decision by providing an update on MNR's progress on involving Aboriginal communities in the benefits of forest management.

Forest management activities and their effects are monitored by MNR to ensure that forest management plans are being followed appropriately and to check on the long-term health of the forest. These monitoring systems are explained in this Report.

The Report concludes with an overview of the ongoing activities and future directions of MNR, as required by the Timber Class EA decision.

With this Report, MNR is providing material that will help the public gain an understanding of how Ontario's Crown forests are being managed. This report provides a baseline of information against which the public may assess future forest management activities and annual reports.

Other documents are available that provide information about forest management. They include:

- the Policy Framework for Sustainable Forests, which lays out the principles for managing forests sustainably in Ontario
- MNR's Statement of Environmental Values, which sets out the environmental principles that govern MNR's management of Ontario's natural resources
- the Crown Forest Sustainability Act
- the Forest Management Planning Manual
- the Forest Operations and Silviculture Manual
- the decision of the Environmental Assessment Board on MNR's Class Environmental Assessment for Timber Management on Crown Lands in Ontario, which contains the reasons behind the EA Board's approval of the forest management planning process and the terms and conditions that the Board set on its approval
- the Forest Resources of Ontario 1996, a snapshot of statistics on the state of Ontario's forests.

Chapter 2

Throughout this document, Crown land and Crown forest refers to the land and forest that is owned by Ontario for the people of the province and, in general, managed by MNR.

The total inventoried land area of the province of Ontario is about 61.5 million hectares, about 40.3 million hectares of which are productive forested lands. The productive forested lands consist of 34.1 million hectares of Crown land, 5.8 million hectares of private land, and 0.4 million hectares of federal land. The Crown productive forested lands are further divided into 26 million hectares where forest management activities take place, 3.6 million hectares of parks, recreational reserves and protection and 4.5 million hectares of Crown land outside the Area of the Undertaking (AOU).

Ontario's Forest Inventory

Ontario has been inventorying its forests since 1922. Using aerial photographs and field checks, MNR classifies forest stands and other areas into broad physical components such as productive forest, non-productive forest, non-forested land, and bodies of water, creating the Forest Resource Inventory (FRI). Each component is further classified by its ownership and land use. This inventory provides a baseline of information for management planning and for monitoring the health of the forest. FRI material was used to help prepare this report.

A new inventory is conducted on each management unit approximately every 20 years and must be updated at the start of each new forest management plan.

The FRI must reflect all changes to the forest (i.e., depletions and accruals) that occurred prior to the commencement of a new forest management plan. Depletions include harvest and natural reductions, such as those through wildfire, insects, disease, and blowdowns. Accruals include the results of forest renewal and tending activities for both assisted and naturally regenerated areas.

Figure 1 illustrates all the land classifications within the inventoried area in Ontario. A detailed table of all land classifications within the inventoried area can be found in Appendix 1.

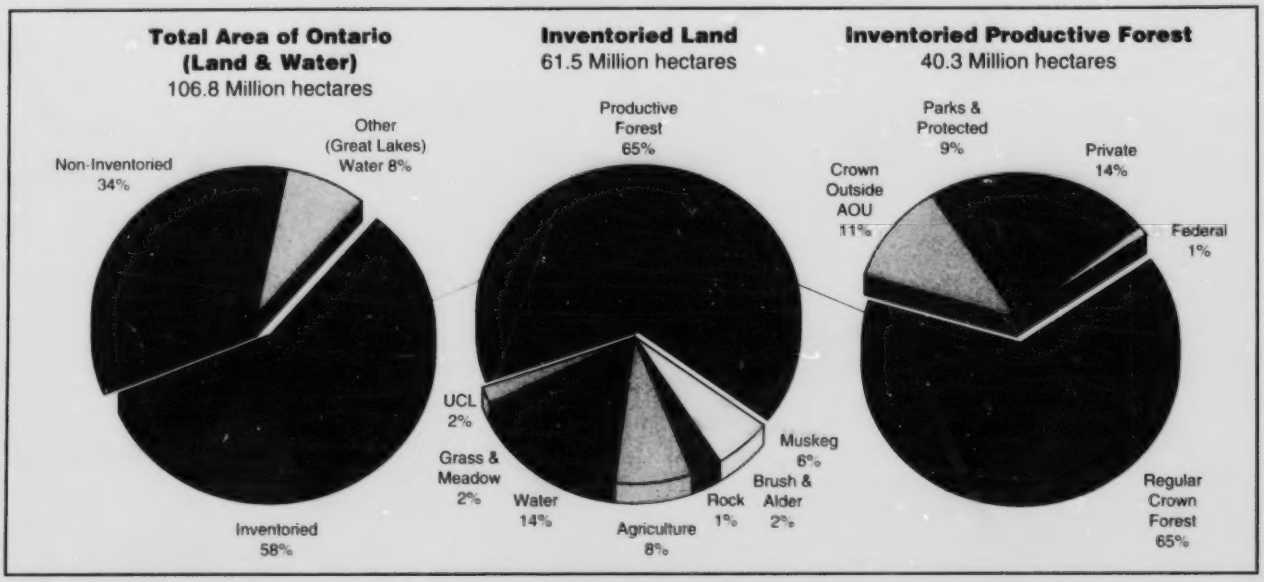

Figure 1

All Land Classifications within Inventoried Area

The Crown, private, and federal proportions of the productive forested areas in each of MNR's three administrative regions are shown in Figure 2.

Figure 2

Ownership of Productive Forested Lands in Ontario (000's hectares)

Ownership	Northwest Region	Northeast Region	Southcentral Region	Total
Crown	17,370.9	14,909.3	1,859.3	34,139.5
Private	642.1	1,774.4	3,347.6	5,764.1
Federal	158.3	228.2	12.4	398.9
Total	18,171.3	16,911.9	5,219.3	40,302.5

Ontario has three major forest regions: the Deciduous Forest in southern Ontario, the Great Lakes–St. Lawrence Forest in southern and central Ontario, and the Boreal Forest in northern Ontario. Apart from provincial parks, there is little Crown land in southern Ontario.

Each forest region has distinct ecosystems, the extent of which is largely determined by temperature and precipitation ranges, and each region has trees, plants, birds, insects and other wildlife characteristic to its type. There are broad zones of natural transition from one forest region to another. The forest regions of Ontario are shown in Figure 3.

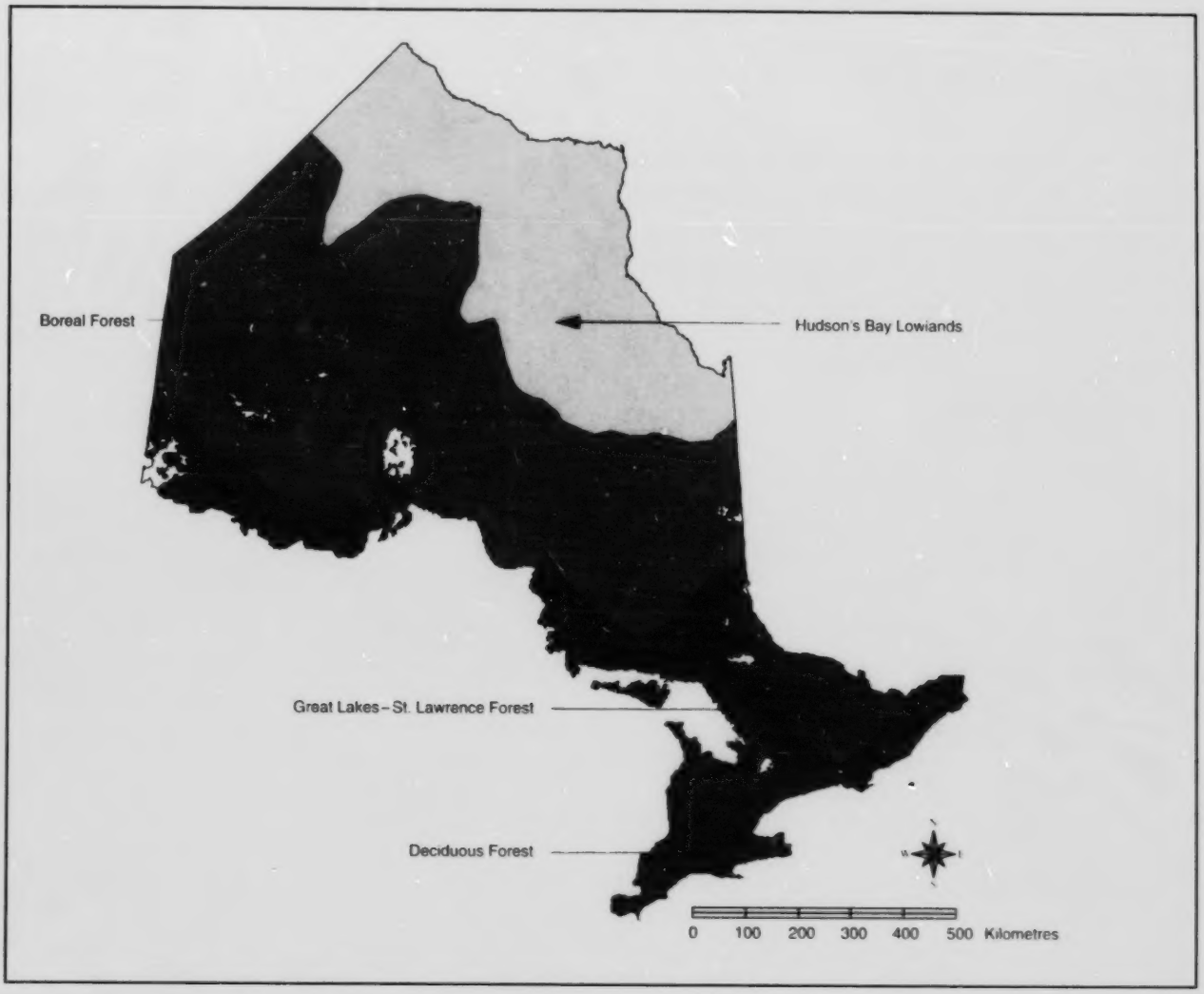

Figure 3
Ontario's Forest Regions Map

The Deciduous Forest is found in the most southern part of the province, mostly in concentrated pockets on private land and within provincial parks on the north shore of Lake Erie. This is the only occurrence of the Deciduous Forest in Canada.

The major deciduous species in this forest region are sugar maple, beech, basswood, red maple and several oaks. In the most southern portion of this region, Carolinian species such as tulip tree, cucumber tree, pawpaw, red mulberry, kentucky coffee tree, black gum, sassafras and redbud are found. Species such as black walnut, sycamore, swamp white oak, shagbark and bitternut hickory, butternut, rock elm, silver maple, and blue ash are largely confined to this region. Conifers such as white pine, cedars, hemlock, spruce, and tamarack occur throughout.

The Deciduous Forest Region is about three million hectares in size. Less than 15 per cent remains in Deciduous Forest, with only about 8,200 hectares of the forest (.003 per cent) owned by the Crown. More than 75 per cent of this forest region is agricultural land. Most of the remaining land is urban.

Human activity in the south has greatly modified the forest, which is now mostly restricted to areas with low agricultural potential. However, forests in this region are among the most productive in the province.

The Great Lakes–St. Lawrence Forest covers a broad band occupying the southern portion of the Precambrian Shield and the limestone area north of the Deciduous Forest. It is characterized by white and red pine and maple. Other conifers in this region are jack pine, black and white spruce, tamarack, and cedar. The intolerant hardwoods found in this region are poplar and white birch. The tolerant hardwoods in their relative order of occurrence are hard maple, oak, and yellow birch. Other hardwoods such as soft maple, black ash, beech, and basswood can also be found in this region.

In the central and northern part of this region, the land is predominantly owned by the Crown. In the south, there is a large amount of privately owned forests, which are managed for forest products, recreation, wildlife habitat and other environmental benefits.

The Boreal Forest is a world-wide band of conifer-dominated forest that stretches across Scandinavia, Russia, Alaska, and northern Canada. In Ontario, the Boreal Forest extends from the northern limits of the Great Lakes–St. Lawrence Forest to Hudson's Bay.

The Boreal Forest is characterized by conifers such as jack pine, black and white spruce, and balsam fir, together with deciduous species such as poplar and white birch.

This forest region is by far the province's largest. Part of the Boreal Forest is further divided into the Hudson Bay Lowlands based on its low site productivity and sub-arctic climate. Most of the land in the Boreal Forest region is Crown land.

The Boreal Forest is influenced by natural disturbances, such as fires, heavy winds, and insects, which can affect large areas of forest. During the last 80 years, timber harvesting and forest fire prevention efforts have affected the mix of tree species and age of the Boreal Forest.

Private Woodlands

Private woodlands at 5.764 million hectares of productive forest area comprise 14% of the inventoried productive forest area in Ontario. About 43% of these are located in Northern Ontario with the remainder in Southern Ontario. In the southwestern portion of the province private woodlands represent in excess of 90% of the total area of woodlands and so take on a special significance.

The Ministry's commitment to healthy forest ecosystems extends to these private forests although it does not have the same direct stewardship responsibility as for Crown Forests. MNR's Private Woodlands Strategy 1991 outlines how MNR will seek to influence the sustainable management of the province's private woodlands through:

- coordinating the programs and efforts of the many agencies and groups interested in promoting stewardship
- providing education and skills training opportunities for landowners to become more knowledgeable about stewardship
- providing effective policies as incentives to stewardship of woodlands.

In 1996/97 MNR continued to implement the Private Land Resource Stewardship Program which started in 1995/96. Led by MNR's 33 Stewardship Coordinators, community stewardship councils consisting of landowners, interest groups and associations and resource management agencies are working together to meet collective community-based stewardship goals. There are about 250 councilors, all of whom are well-connected with local land- and resource-based organizations. This program provides:

1. a forum for determining and expressing local needs and concerns,
2. for improved coordination of resource agency resources and program delivery,
3. for enhanced access to information and educational opportunities, and
4. for enhancing partnerships, teamwork, respect and understanding between landowners and those with an interest in the land and its environmental, social and economic benefits.

In 1996/97, the Ministry, in addition to providing the funding for the Stewardship Coordinators, made available grants totaling $500,000 to approximately 38 local councils to assist them in levering additional funds

to carry out local projects. This support encouraged 500 projects that ranged from conducting workshops on woodland tax and estate planning to restoring native vegetation in school yards.

In recognition of the importance of maintaining private woodlands, MNR reinstated the Managed Forest Tax Rebate Program for the 1996 tax year. There were approximately 81,000 hectares of eligible woodlands and $3.8 million in tax rebates were paid out.

Chapter 3

In 1995, the Crown Forest Sustainability Act (CFSA) came into effect. The CFSA mandates that the province's Crown forests must be managed to ensure they remain large, healthy, diverse and productive.

Since the CFSA became law, MNR has been active in implementing the requirements of this legislation, which include well-defined management planning for the forest and public participation in the process.

Under the terms of another piece of Ontario legislation, the Environmental Assessment Act, the Environmental Assessment Board reviewed MNR's planning process for Crown forests and approved it, with terms and conditions. Many are referred to in this report.

To handle the management of Ontario's Crown forests, the province is divided into management units. MNR requires an approved forest management plan to be in place in each management unit before any forest operations are undertaken. This ensures the long-term health of the forest covered by a plan. A map of Ontario showing the location of all management units is in Appendix 2. The key to the map identifies the name of the management units and indicates who has forest management planning responsibility, (eg. Crown (MNR) or a Sustainable Forest Licence holder).

In recent years, there has been an amalgamation of some management units to realize efficiencies and improve implementation. As of April 1999, there were 68 management units, and additional amalgamation proposals were being evaluated.

Forest management plans are prepared according to the Forest Management Planning Manual, which directs how planning is to be carried out, monitored, reported on, and evaluated.

All forest management plans have a 20-year perspective and a five-year plan of operations. The five-year plan lays out what may be harvested, how it may be harvested, how harvested forests are to be renewed, and what values, such as archaeological sites, wildlife habitat, or recreational facilities, are to be protected.

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MNR monitors plan implementation for each management unit to ensure that the plan is followed appropriately. All plans are renewed on a five-year planning cycle. A period of approximately 24 to 27 months is required for the preparation, review, and approval of a forest management plan.

In accordance with the requirements of the Timber Class EA decision for an annual report, the forest management planning schedule for management plans to be implemented in 1996, 1997, 1998 and 1999 is shown in Appendix 3.

The Forest Management Planning Manual

The Crown Forest Sustainability Act requires that forest management plans be prepared and approved following the Forest Management Planning Manual. The manual provides direction on how to determine sustainability and requires that information,such as the following, be included in a forest management plan:

- **an environmental, social, and economic description of the management unit**
- **long-term strategic direction for the management of the forest, including how sustainability is measured through the analysis of a range of management alternatives and the selection of the preferred alternative, the determination of areas eligible for operations during the 20-year period of the plan, and the planning of primary access corridors for the 20-year period**
- **areas of operations, the development of operational prescriptions, and the determination of primary and secondary access road locations for the five-year term of the plan**
- **a description of the program for monitoring forest management operations, and assessing renewal success**
- **supplementary documentation requirements, and a forest management plan summary**

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- **a description of the program for monitoring forest management operations, and assessing renewal success**
- **supplementary documentation requirements, and a forest management plan summary**

Chapter 4

Ontario's Crown forests provide the raw materials for a diverse number of forest-based industries, including construction materials, pulp, paper, and newsprint. Crown forests also provide opportunities for tourism, recreation, trapping, hunting and fishing, and food production. In addition, service industries and facilities that support forest activities also depend on Crown forests.

In 1996, the forest industry contributed significantly to the economy of Ontario with estimated sales of approximately $12 billion. Employment in 1996 increased by 4% over 1995, with the forest industry directly employing 65,500 workers, and providing jobs for another 133,000 through indirect, and induced employment.

In 1996/97, more than 50 Ontario communities, mostly located in northern Ontario, had at least one-third of their labour force employed in the forest industry. Appendix 4 lists those Ontario communities having at least one-third of their workforce dependent on the forest products industry. The appendix also shows their labour force and what percentage worked in the forest sector.

As well as being a major employer, the forest industry annually invests in capital improvements and mill expansions. In 1996, the forest industry had capital and repair expenditures of over $ 1.5 billion. This is up from 1995 when capital expenditures were almost $1 billion.

The Forest Products Industry

The forest products industry is comprised of the logging industry, the wood industries, paper and allied industries, and other related industries such as the manufacture of furniture and fixtures.

The logging industry is made up of both large and small contractors, as well as large, mill-owned operations. The contractors may work independently or directly for company-owned mills.

The wood industries include businesses such as sawmills, veneer mills, structural board and plants producing construction materials and specialty wood products. The capital investment in these mills range from a few thousand to several million dollars.

Pulp and paper mills are the largest types of plants for converting timber to forest products. A greenfield pulp mill can cost upwards of $1 billion. Their output represents over 60% of the value of all forest product shipments.

Figure 4 shows the distribution of various manufacturing activities by sector and direct employment within each sector.

Figure 4
Distribution of manufacturing activities by sector and direct employment within each sector

	No. of Establishments		No. of Employees		Total Value Added	
Sector	Number	% of Canadian Total	Number	% of Canadian Total	Value Added ($ Millions)	% of Canadian Total
Logging	1,492	15	5,508	12	475	12
Wood Industries	617	21	24,422	21	1,539	17
Paper & Allied Industries	303	44	35,895	34	5,052	27
Total	2,412	18	65,825	24	7,066	22

Source: Statistics Canada, 1995

The Licensing System

The majority of Ontario's forests are harvested by companies or individual operators that hold one of two types of licences: Forest Resource Licences (FRLs) and Sustainable Forest Licences (SFLs). The total land under licence is shown in Figure 5.

In 1996/97 six new SFLs were signed bringing an additional 2,176,250 hectares under licence.

Figure 5

Crown production forest area under licence 1996/97 by licence type

Licence Type	Number of Licences	Productive Forest Area (hectares)
FRL < 100 hectares	3,957	29,740
FRL > 100 hectares	400	6,887,310
FRL: Salvage	32	14,800
SFL	37	17,253,460
Other Licences	63	2,330
TOTAL	4,489	24,187,640

Forest Management Responsibilities in Ontario

An SFL requires a licensee to prepare forest management plans, following the direction of the Forest Management Planning Manual. The licensee is responsible for implementing forest management plans by carrying out access, harvest, renewal and maintenance activities. The SFL holder must follow the rules set by MNR to ensure forests are sustainably managed.

With FRLs, the licence holders operate under Forest Management Plans approved by MNR and require the holder to operate in a way that ensures the long-term health of the forest.

Ontario's Stumpage System

In 1996/97, the Government of Ontario received direct payments from the forest industry in the form of royalty or stumpage payments and area charges, and indirect payments in taxes.

Forest companies pay a stumpage fee to the Crown for every cubic metre of timber harvested. MNR uses a market-based pricing system to calculate stumpage fees that companies and individuals pay for harvesting timber from Crown land to ensure the province receives a fair return for its resource. In times of strong market prices for forest products, the market-based system triggers higher fees. In times of low prices, forest industries pay lower fees.

The Crown's stumpage fees are made up of three parts:

- A fixed minimum charge per cubic metre of harvested timber, regardless of species harvested, that goes into the consolidated revenue of the province. The minimum charge was raised by $0.25 to $1.50 per cubic metre on April 1, 1996. This charge is adjusted annually.

- A forest renewal charge to provide dedicated funding for forest renewal. This charge varies depending upon the tree species and the anticipated renewal cost for that species. Forest renewal charges are held in either a Forest Renewal Trust fund or a Forest Renewal Special Purpose Account and may only be reinvested in maintaining the health of Ontario's forests.

- A residual value charge, paid to the province's consolidated revenues by forest companies or individuals licensed to harvest timber. The calculation of this charge varies from zero in times of low product prices up to $20 per cubic metre in times of high product prices.

The forest industry also pays into the Forest Futures Trust fund through an area-based charge. The area charge is assessed for each square kilometre or part of a square kilometre of productive forest land under licence. In 1996 the area charge was $ 102 per square kilometre.

Figure 6 shows the direct payments from the forest industry to the various government accounts during the last five fiscal years. The Forest Renewal Special Purpose Account will be phased out once all Crown management units, currently under direct management by MNR, have been converted to SFLs.

In addition to direct payments to government revenue and renewal accounts, the forest industry pays a significant amount annually in taxes.

Figure 6

Payments by the Forest Industry ($000s)

Year	Area Charges	Forestry Futures	Consolidated Revenue	Forest Renewal Trust	Forest Renewal Trust & SPA***	Total Payments
1992-93	9,300.7		63,094.0			72,394.7
1993-94	19,723.0		85,025.6			104,748.6
1994-95	14,366.6	6,000.0*	98,674.8		32,960.7	146,002.1
1995-96	9,905.8	7,121.3**	89,162.2	58,628.6	36,505.5	201,323.4
1996-97	11,269.7	7,861.4	111,669.0	51,628.9	34,755.1	217,184.1

* Initial contribution by MNR
** For the period February 7, 1995 to March 31, 1996
*** Amounts are as of March 31, 1999

Note: Funds in the Forest Renewal Trust, the Forest Renewal Special Purpose Account, and the Forestry Futures Trust are not considered revenue by the Province, although funds in the Forest Renewal Special Purpose Account are held in the province's Consolidated Revenue Fund.

Chapter 5

Forest management attempts to regulate or adapt to "disturbances" within the forest, caused by natural (e.g., insects, disease, weather calamities, forest fires) and human (e.g., harvesting) activities. These disturbances are numerous and occur throughout the forest life cycle, illustrated in Figure 7.

Disturbances are measured in terms of forest area (hectares) and volume (cubic metres) of trees killed, damaged or harvested; the degree to which a forest stand must be impacted by these disturbances before the inventory description is changed, is a subjective decision. Thus, the change in volume and area in a forest stand that results from natural mortality every year is not usually significant enough to be recorded for inventory update purposes. For example chronic diseases such as root rot may kill only a few trees scattered throughout the forest stand. Therefore no area of disturbance is recorded for this disease but estimates of the volume of wood in the dead trees and volume of growth loss in the remaining live trees is reported.

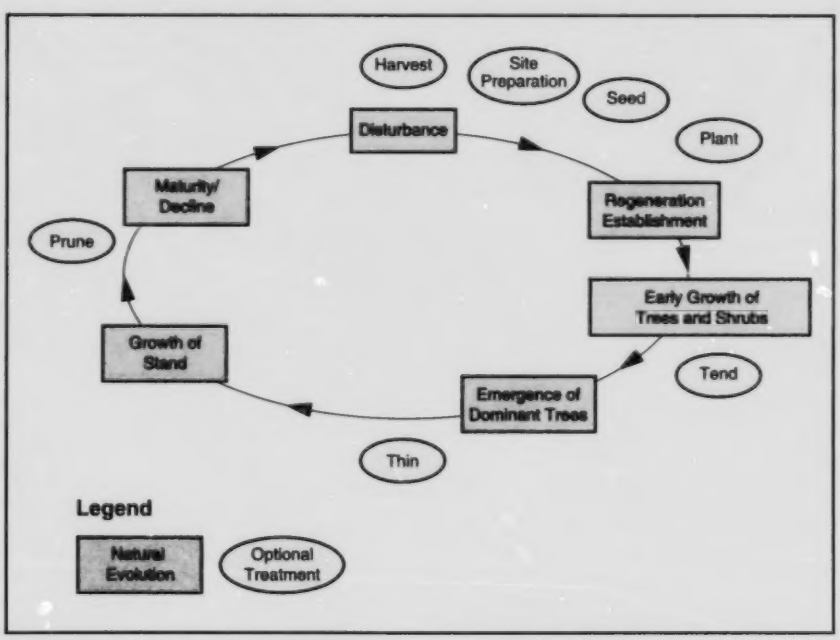


Figure 7

The Forest Life Cycle

The most significant disturbances are reported in the fall of the year following a disturbance. Thus, the most recent disturbances reported in this 1996/97 report actually occurred during 1995/96. Reporting is delayed to allow time to completely map and inventory all disturbances that occurred during a given year.

Harvesting

The level of allowable harvest in a management unit is determined through the forest management planning process. MNR requires that the allowable harvest for a management unit be set at a level that will sustain a healthy forest over time. Harvesting in each management unit is controlled and monitored according to the approved forest management plan. These plans specify both allowable harvest area and the associated volumes. However control of the allowable harvest is by area.

Harvesting in Ontario is one of a series of actions that when combined represents a silvicultural system. Silvicultural systems combine harvesting, forest renewal and tending and are classified according to the method of harvesting.

Silvicultural Systems Used in Ontario

Ontario uses three silvicultural systems:

Clear-Cut System in which the entire growth is harvested in one operation, with or without leaving seed trees. Harvesting may be done in blocks, strips or patches. Regeneration can be natural or assisted. This method will produce stands in which all the trees are at about the same period of growth or age-class and is referred to as even-aged management.

Shelterwood System in which mature trees are harvested in a series of two or more cuts to encourage natural regeneration under the residual trees. This may be done by cutting uniformly over the stand area or in narrow strips. This method also produces stands in which the trees are the same age.

Selection System in which mature and undesirable trees are continuously removed individually or in small groups over an entire area, over the forest life cycle. This method produces stands in which trees are of different ages and is referred to as uneven-aged management.

The break-down of the total provincial area harvested in 1994/95 and 1995/96 into the even-aged and uneven-aged management systems is

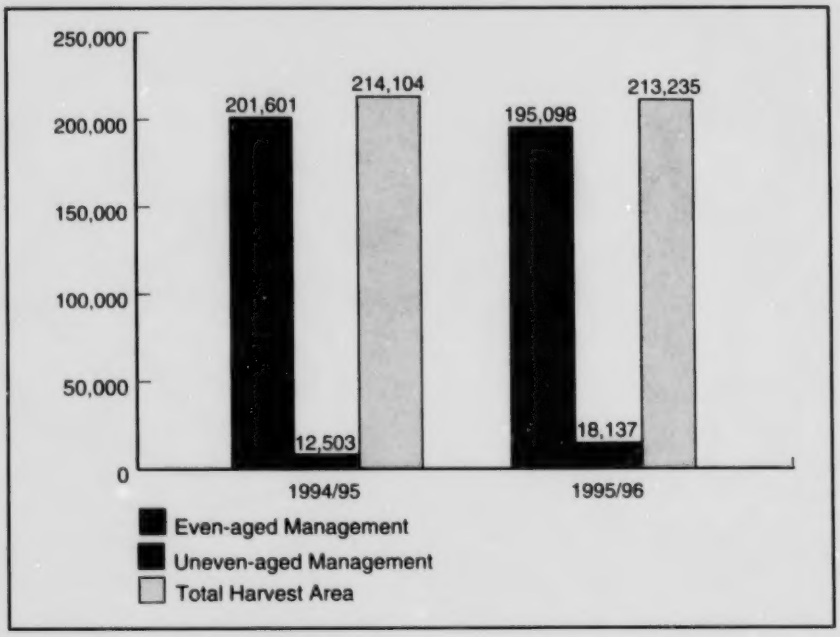


Figure 8
Harvest Area (hectares) 1994/96 by Management System

illustrated in Figure 8. This figure shows that the overall total harvest area decreased slightly in 1995/96 from 1994/95 by about 870 hectares while the area managed using uneven-aged management increased by about 5600 hectares.

Figures 9, 10 and 11 show the provincial harvest areas and volumes, fire disturbances from 1991 to 1995, and total area harvested in 1994/95and 1995/96 within each MNR administrative region. As Figure 9 and 10 shows annual area and volume harvests were at their lowest level in 1991. Annual harvest area peaked in 1994 and annual harvest volume peaked in 1995. The low harvest level reported in 1991 was primarily due to reduced

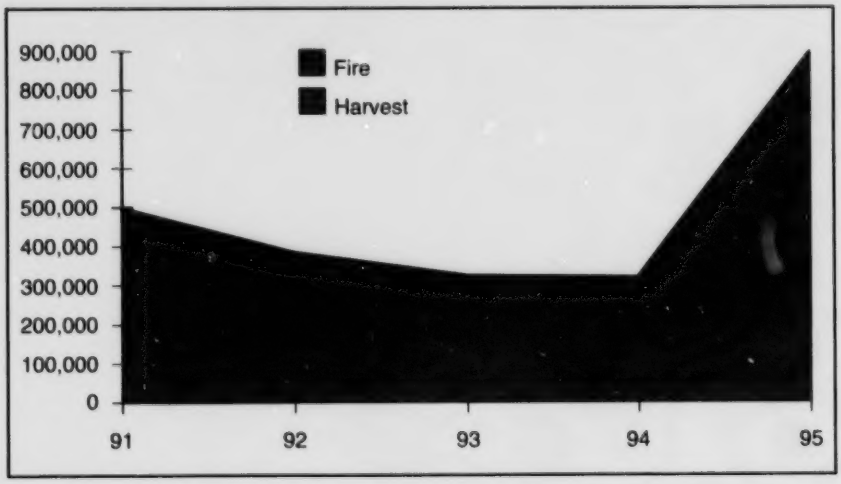
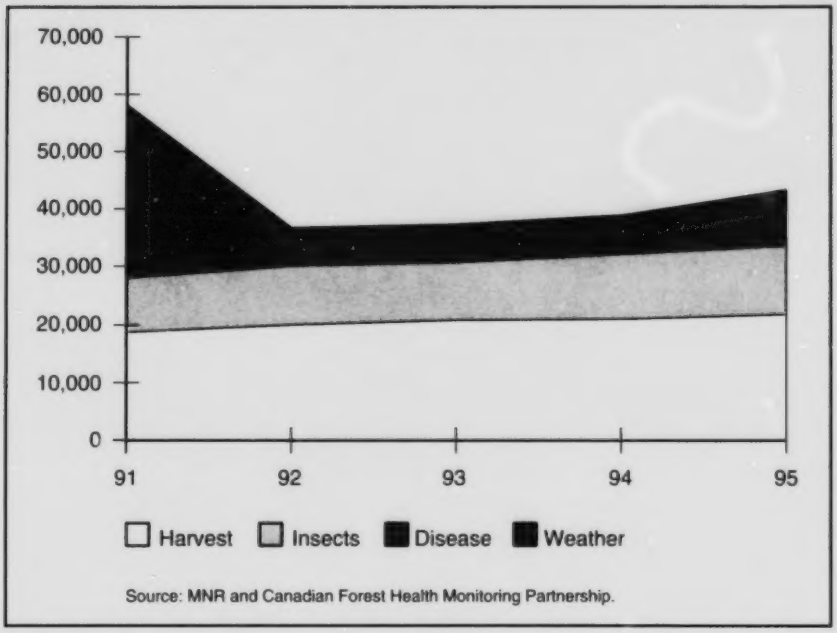


Figure 9
Forest Area (hectares) Disturbed by Harvest and Fire 1991–95

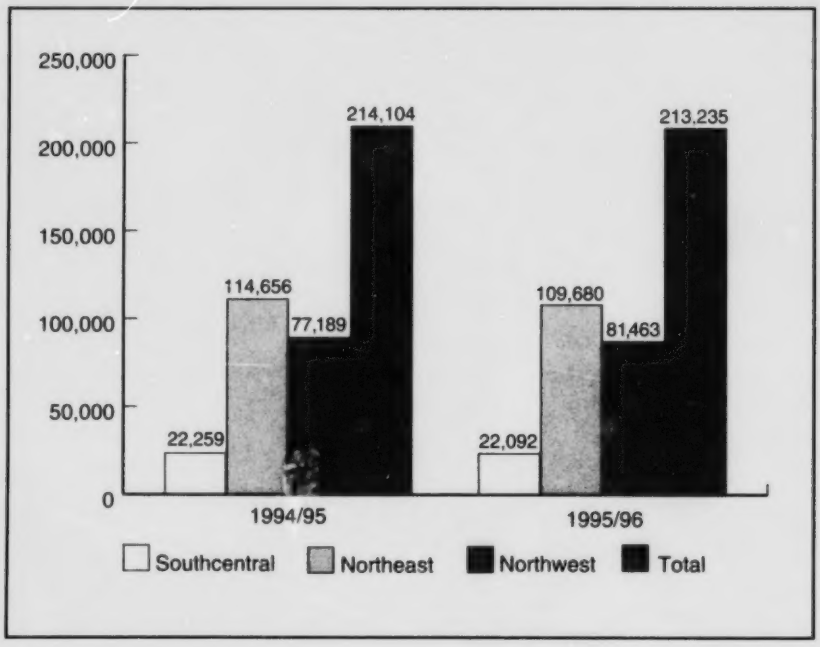
Figure 10
Wood Volume (000's m³) Harvest and Other Disturbances 1991-95



demand for forest products caused by the recession. Since then, demand for products and harvest levels have rebounded and continue to reflect changing market conditions.

Comparisons of natural and human disturbances to the forest over the past five years are shown in Figures 9 and 10.

Figure 11
Area Harvested (hectares) 1994/95 and 1995/96 by MNR Region



For 1995/96, the total provincial harvest area of approximately 213,235 hectares is less than a one per cent decrease over the previous year's total. The largest regional harvest area was in Northeast region with a harvest of 109,680 hectares, representing approximately 51 per cent of the total, as shown in Figure 11. MNR's Northwest region had the second largest regional harvested area at 81,463 hectares, 38 per cent of the total. The Southcentral region, which has a much smaller forest area, had the smallest total harvest at 22,092 hectares, 11 per cent of

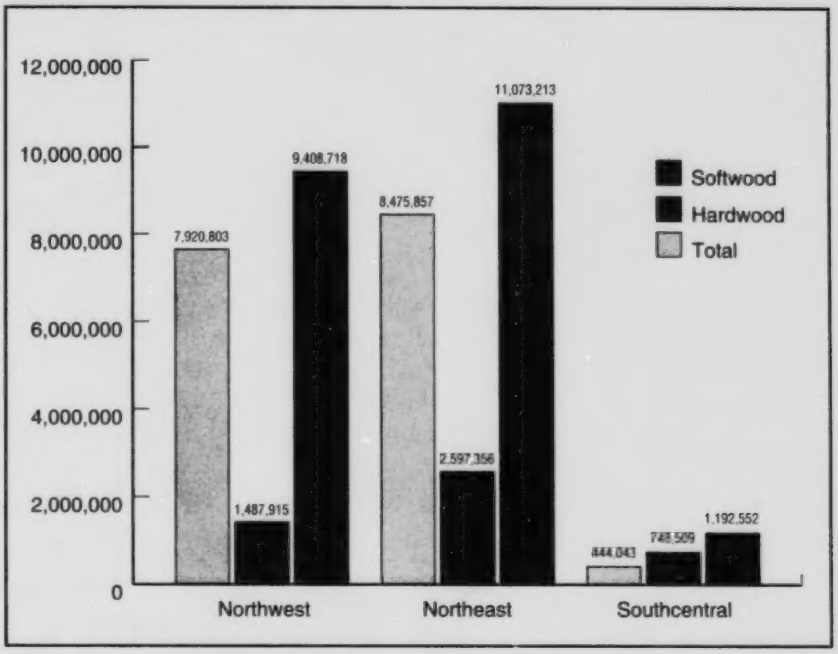


Figure 12
Wood Volume Harvest (m^3) by MNR Region and Species Group 1995/96

the total. The regional breakdown of harvest changed very little from 1994/95.

Wood volumes harvested in 1995/96 in MNR's three administrative regions are shown in Figure 12. Total provincial hardwood and softwood volumes harvested in 1994/95 and 1995/96 are shown in Figure 13.

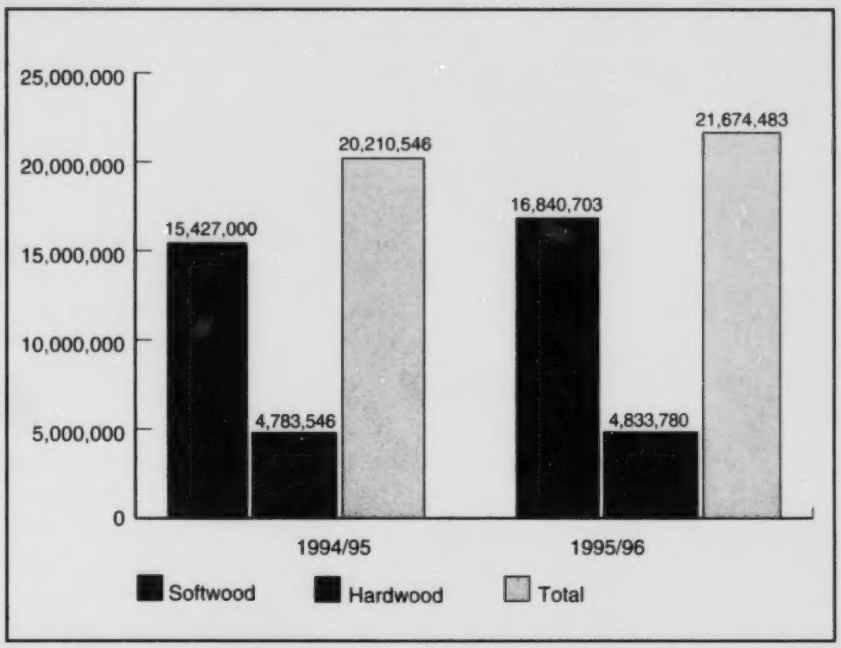


Figure 13
Hardwood and Softwood Volumes Harvested (m^3) in 1994/95and 1995/96

In 1995/96, the total provincial harvest volume was 21,674,483 cubic metres. The 1995/96 regional total harvest volumes were:

- Northwest region 9,408,718 cubic metres or 43 per cent of the total harvest volume
- Northeast region 11,073,213 cubic metres or 51 per cent of the total harvest volume
- Southcentral region 1,192,552 cubic metres or 6 per cent of the total harvest volume

The greatest demand was for softwood tree species, with these species accounting for 78 per cent of the total harvest volume with a total harvest of 16,840,703 cubic metres. This is a 9 % increase over the 1994/95 softwood harvest. The 1995/96 regional softwood harvest was:

- Northwest region: 7,920,803 cubic metres
- Northeast region: 8,475,857 cubic metres
- Southcentral region: 444,043 cubic metres

The total provincial hardwood harvest volume of 4,833,780 cubic metres accounts for 22 per cent of the total harvest volume. This is a 1% increase from the 1994/95 hardwood harvest. The regional harvest volumes for hardwoods was:

- Northwest region: 1,487,915 cubic metres
- Northeast region: 2,597,356 cubic metres
- Southcentral region: 748,509 cubic metres

Ontario's forest harvest in 1995/96 was approximately 22 million cubic metres which represents approximately 7% increase over the 1994/95 harvest volume. This increase is mainly due to increases in the harvest of jack pine and black spruce tree species. Fluctuations in the harvest volumes of individual tree species from year to year is in large part due to changes in market demand and variations in tree species encountered on the harvested areas. The harvest volume by species for 1994/95 and 1995/96 are shown in Figure 14.

Figure 14

Harvest by Volume and Species

Softwood Species	1994/95 Harvest	1995/96 Harvest
White Pine	499,788	399,449
Red Pine	135,310	233,696
Jack Pine	5,799,161	6,680,188
White Spruce	2,955	18,914
Black Spruce	8,102,082	8,911,538
Hemlock	11,144	12,588
Balsam	847,633	569,311
Cedar	9,111	3,087
Tamarack	5,415	7,602
Other Softwoods	14,401	4,330
Total Softwoods	15,427,000	16,840,703

Hardwood Species	1994/95 Harvest	1995/96 Harvest
Maple	410,141	485,235
Yellow Birch	53,852	48,342
White Birch	243,355	223,259
Oak	20,035	30,491
Beech	26,691	32,747
Poplar	3,760,941	3,876,163
Basswood	14,504	12,601
Ash	2,845	3,910
Other Hardwoods	251,182	121,032
Total Hardwoods	4,783,546	4,833,780
Provincial Totals	20,210,546	21,674,483

Natural Disturbances

Natural disturbances include fire disturbances and damage from insects, disease and severe weather conditions. The intensity of disturbance varies from year to year.

Forest Fires: The number and size of forest fires varies dramatically from year to year, depending on the weather, as shown in Figure 9. MNR records area disturbed by forest fires across all the forested area of the province and not just for the Area of the Undertaking as is the case for harvest depletion. During the period 1990 to 1995, annual fire disturbances

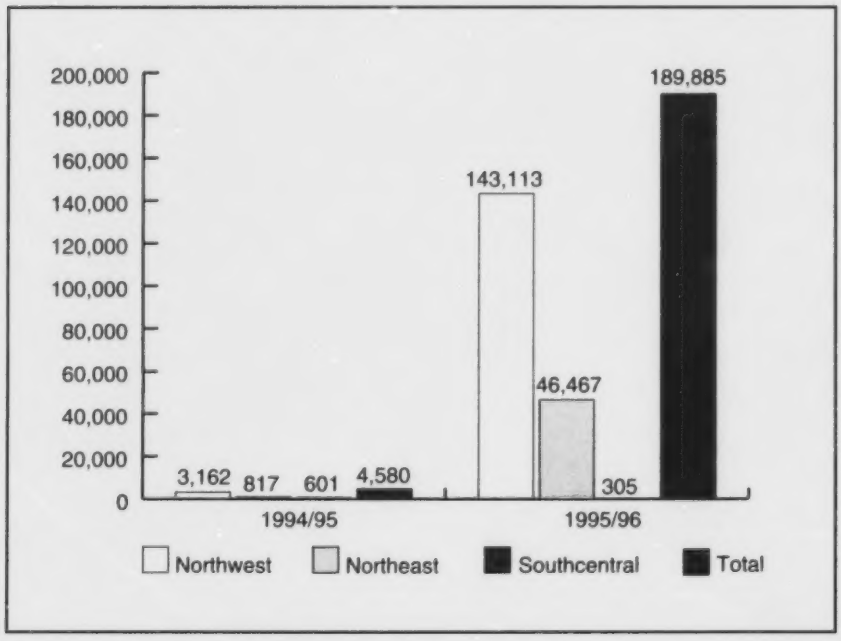
peaked in 1995 at more than 590,000 hectares of forest. The smallest annual area disturbed by fire in that period occurred in 1994 at 80,000 hectares.

The total fire disturbances for 1995/96 within the Area of the Undertaking amounted to 189,885 hectares. This represents about 32 per cent of the total provincial forest area burned that year. The other 68 per cent occurred outside the Area of the Undertaking, mostly in the far north.

Depending on the severity of the damage to trees from fire, it is often possible to conduct salvage operations to harvest timber. Salvage operations are reported as harvesting.

Figure 15 shows the area depleted by forest fires during 1994/95 and 1995/96 in the Area of the Undertaking in MNR's three administrative regions. Total area burned in 1995/96 increased to 189,885 hectares from 4,580 hectares in 1994/95. Seventy-five percent of the area burned within the AOU in 1995/96 was within the Northwest region.

Figure 15
Area Disturbed by Forest Fire (hectares) 1994/95 and 1995/96 by MNR Region



Insects, Disease: Estimates of volume losses from 1990/91 to 1995/96 due to insects, disease and severe weather are shown in Figure 10. This figure shows that insect losses were at their lowest in 1990 (7,156,500 cubic metres) and at their highest in 1995 (11,841,300 cubic metres). The magnitude of these losses have not been adjusted to reflect abnormal impacts from that which has always been a part of the natural forest

growth and succession. Diseases are shown to be a consistent 5,466,400 cubic metres over the period because these losses are normally chronic and are estimated by calculating an annual average loss for all chronic diseases over the period studied (i.e., 1988-1997).

Severe Weather: Volume losses from severe weather occurrences were very erratic over the period, peaking in 1991 due to a severe windstorm in the Northwest part of the province that affected over 260,000 hectares. Reported severe weather volume losses from 1992 to 1995 were caused by drought. Weather related volume losses were less than 100,000 cubic metres from 1992 to 1994 and then peaked in 1995 with an annual estimated loss of 1,840,000 cubic metres. The large drought volume losses reported in 1995 occurred in the northern part of North Bay District and the southern part of Nipigon District.

The wood volumes estimated to have been lost in 1994/95 and 1995/96 by natural causes are listed on the next page.

Disturbance Type	1994/95 Volume Losses	1995/96 Volume Losses
Insects	11,048,400 cubic metres	11,841,300 cubic metres
Disease	5,466,400 cubic metres	5,466,400 cubic metres
Severe Weather	21,500 cubic metres	1,840,000 cubic metres
Total	16,536,300 cubic metres	19,147,700 cubic metres

These estimates pertain to Crown production forest within the area of the undertaking only. The volume losses due to tree mortality caused by insects, disease and severe weather (e.g., drought, windstorm) shown in Figure 10 are based on studies done for the years 1988 to 1997 by the Forest Health Monitoring Unit of the Canadian Forest Service and MNR. Mortality and growth losses in surviving trees are included in the estimates. Depending on the severity of damage to trees from insects, disease, or wind storm, it is often possible to conduct salvage operations to harvest timber and reduce the threat of forest fires.

Insect Damage: The damaged area and volume loss caused by the most damaging insects are based on estimates of the forested areas on which 30 per cent or more of the foliage was removed. Usually a number of years in which defoliation occurs is required to kill a tree, and this varies with the pest, the tree species being attacked, and other factors. Insects that do significant damage to Ontario forests include the spruce budworm, the jack pine budworm, the forest tent caterpillar, and the gypsy moth. In 1994/95 and 1995/96 the estimated volume losses due to mortality and growth losses for each of these insects are listed below:

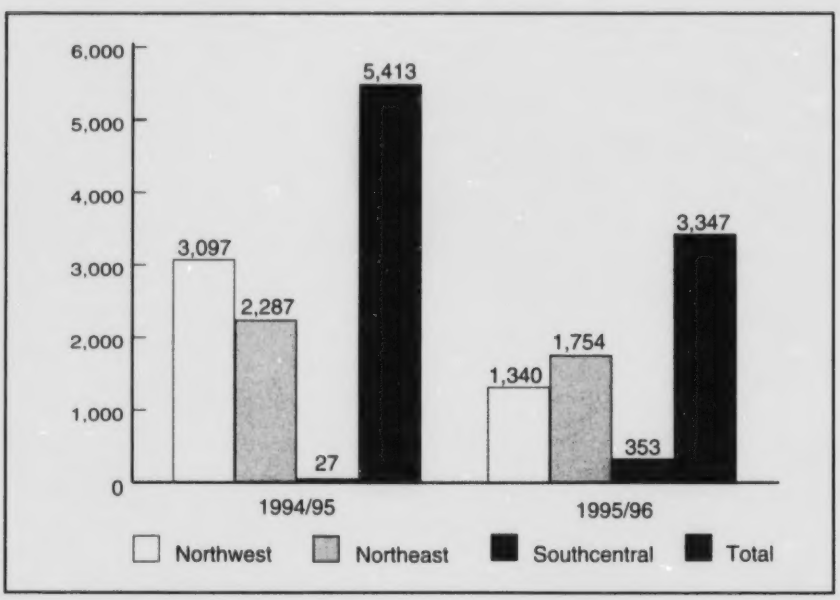
Insect	1994/95 Volume Loss	1995/96 Volume Loss
Spruce Budworm	10,392,400 cubic metres	11,225,300 cubic metres
Jack Pine Budworm	54,700 cubic metres	66,300 cubic metres
Forest Tent Caterpillar	353,400 cubic metres	0
Gypsy Moth	1,300 cubic metres	2,500 cubic metres
Total	10,801,800 cubic metres	11,294,100 cubic metres

Forested areas may be defoliated by more than one insect. Area reported as defoliated may include different degrees of severity.

Disease Damage: The estimate of volume loss due to growth loss and tree mortality caused by chronic disease damage shown in Figure 10 is an annualized average based on estimates of mortality and growth loss caused by root rot, stem decay and foliage dieback.

Severe Weather Damage: The most common weather disturbances causing significant tree mortality and volume losses are windstorms (damage is commonly referred to as "blowdown"), and drought. Windstorms occur periodically but must affect a sizable area in order to be recorded. The area reported as being damaged by windstorms in 1994/95 and 1995/96 are listed in Figure 16 by administrative region. The total area damaged in 1995/96 was about 3347 hectares which was a significant reduction from the total of 5413 hectares reported in 1994/95. These figures were reported by individual management units and are not part of the volume estimates provided by the forest health surveys

Figure 16
Windstorm Damaged Area (hectares) 1994/95 and 1995/96 by MNR Region



Chapter 6

Under the terms of the Crown Forest Sustainability Act (CFSA), forest companies have responsibility to fully renew the forests where they operate. Sustainable Forest Licence (SFL) holders are required to ensure that areas harvested are renewed to specific silviculture standards, as established in forest management plans, to ensure the long-term sustainability of Crown forests.

MNR is responsible for renewal on management units that are not yet covered by an SFL.

Renewal

In Ontario, Crown forests are renewed by both assisted and natural regeneration techniques. These activities are planned for in the forest management plan for each management unit. Renewal includes preparing an area depleted by harvest or natural causes for regeneration through mechanical or chemical means or by a prescribed burn.

The two most common types of assisted regeneration are planting and seeding. Planting includes planting of bareroot seedlings, container seedlings, or cuttings. Seeding may be done directly from aircraft or by broadcast seeders on the ground.

Many tree species can re-establish themselves on a site without planting or seeding. This natural regeneration can be enhanced through careful selection of a silviculture system and harvest method (see Chapter 5).

Reported levels of regeneration (i.e. natural regeneration and assisted regeneration) over the years 1992 to 1996 are shown in Figure 17. Regeneration levels tend to follow fluctuations in harvest and, to a lesser degree, forest depletions from natural causes such as forest fires and insect epidemics. The decline in harvesting in 1991 followed by a steady increase since is mirrored somewhat by renewal levels. Regeneration levels declined and reached their lowest levels in 1994 and have since rebounded.

M121

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Bare-root stock: a seedling with its roots bare of the initial growing medium at the time of planting.

Site preparation: disturbance of the forest floor and upper soil horizons and vegetation to create suitable conditions for artificial regeneration by mechanical or chemical means or by prescribed burning.

Scarification: mechanical preparation of a site for natural regeneration.

Prescribed burn: the knowledgeable application of fire to a specific land area to accomplish predetermined resource management objectives.

The average total provincial harvest area over the 5-year period from 1991 to 1995 is approximately 200 thousand hectares. The average total provincial regeneration level over the 5 year period from 1992 to 1996 is approximately 161 thousand hectares, or about 20% less than the average harvest level. Reasons for this shortfall in the reported renewal levels are as follows:

1. Natural regeneration has not been fully reported in the past. Before new regulations came into effect in 1996, some forest companies did not report natural regeneration annually, preferring to report it periodically after early regeneration surveys had been completed. They are now required to report natural regeneration annually. It will take a few years for this reporting requirement to be completely implemented.

2. Renewal activities tend to follow harvesting by several years. Harvested areas are usually prepared for renewal by clearing away slash and debris.

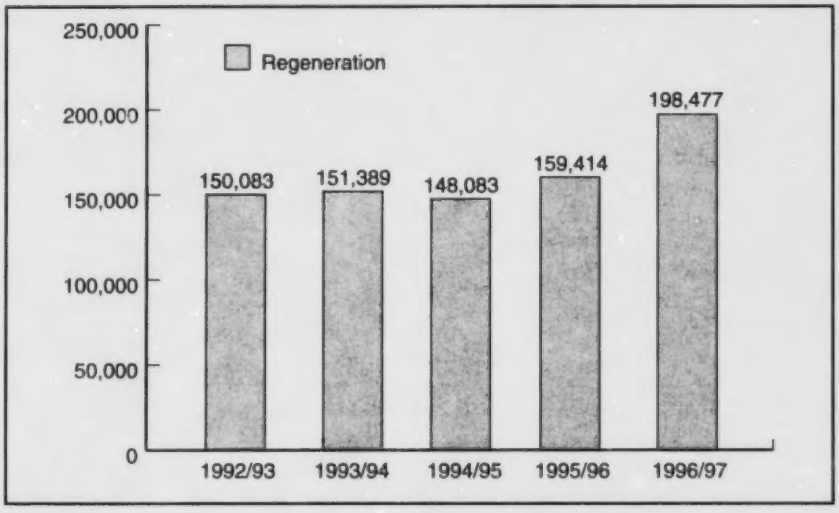

Figure 17 Forest Regeneration (hectares) 1992-1996

Figure 18 summarizes the renewal operations conducted on Crown land in 1996/97 for the province and for each MNR region. The area renewed in 1996/97 includes areas harvested and areas burned in 1995/96 and earlier.

Tending and Protection

Forest tending operations are carried out to improve the survival, growth or quality of a regenerating forest. Tending may be done in young stands to help attain free-growing status. Tending may also be conducted in uneven-aged stands to maintain the desired age-class distribution and volume.

REGENERATION	Northwest	Northeast	Southcentral	Province
UNEVEN-AGED MANAGEMENT				
Selection cut (hectares)	450	5,346	12,549	18,345
Total uneven-aged management	450	5,346	12,549	18,345
EVEN-AGED MANAGEMENT				
Natural regeneration (hectares)				
Clear cut	9,664	48,791	2,000	60,455
Strip cut	251	230	27	508
Seed tree cut	644	3,908	38	4,590
Uniform shelterwood cut	344	10,242	6,952	17,538
Subtotal natural regeneration	10,903	63,171	9,017	83,091
Assisted (artificial) regeneration				
Planting (hectares)	32,851	38,297	1,418	72,566
Trees(000's)				
Bareroot	9,669	8,905	1,345	19,919
Container	34,929	46,455	0	81,384
Cuttings	0	547	0	547
Seeding (hectares)				
Direct	9,094	9,081	64	18,239
With site preparation	2,182	1,525	0	3,707
Scarification (hectares)	726	543	1,260	2,529
Subtotal Assisted Regeneration				
Hectares	44,853	49,446	2,742	97,041
Trees (000's)	44,598	55,907	1,345	101,850
TOTAL REGENERATION (hectares)	**56,206**	**117,963**	**24,308**	**198,477**
SITE PREPARATION (hectares)				
Mechanical	46,296	30,236	962	77,494
Chemical	3,712	1,016	211	5,739
Prescribed burn	292	41	64	397
TOTAL SITE PREPARATION (hectares)	**50,300**	**32,093**	**1,237**	**83,630**
TOTAL RENEWAL ACTIVITIES (hectares)	**106,506**	**150,056**	**25,545**	**282,107**

Figure 18

Provincial Renewal Operations 1996/97

Cleaning: a manual, mechanical or chemical operation in a young stand to reduce, eliminate or suppress undesirable competing vegetation. Cleaning promotes growth in desirable trees by removing competing vegetation of similar age that overtop them or are likely to do so.

Improvement cutting: the elimination or suppression of less valuable trees in favour of more valuable trees, typically in a mixed, uneven-aged.

Thinning: a cutting made in an immature stand to accelerate growth of the trees left uncut. The goal is to foster quality growth, improve composition and promote sanitation.

Commercial thinning: removing trees from a developing young stand, so that the remaining trees will have more growing space; dead and dying trees will be salvaged; and the operation will make a net profit.

Pruning: the removal of live or dead branches from a standing tree, for the improvement of the tree or its timber.

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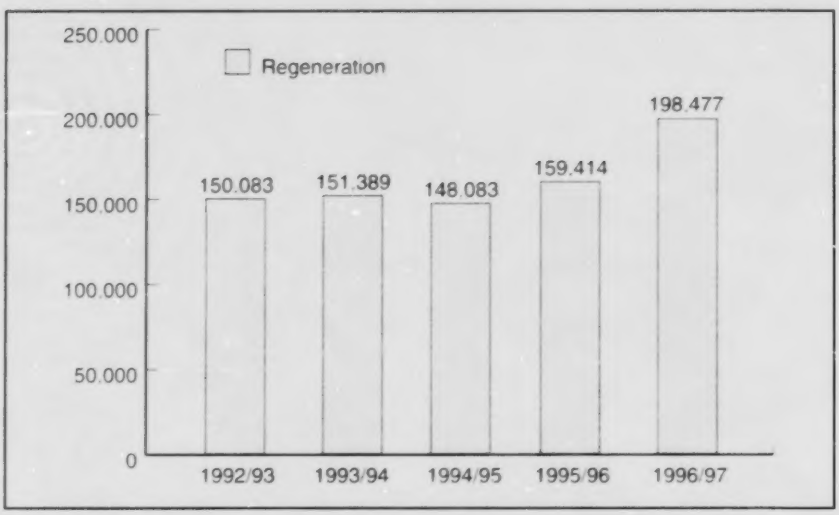

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Renewal Charge Rates:
May 1, 1996 to
March 31, 1997

White and red pine :
$11.00 per cubic metre

All other conifers :
$6.00 per cubic metre

Poplar and white birch:
$0.50 per cubic metre

Grade 1 Hardwoods:
$8.00 per cubic metre

Grade 2 Hardwoods:
$1.50 per cubic metre

Figure 19 Provincial Tending and Protection Activities 1996/97 (hectares)

TENDING	Northwest	Northeast	Southcentral	Province
Cleaning				
Manual	139	1,526	1,194	2,859
Chemical — ground	2,253	1,287	596	4,136
Chemical — aerial	25,821	50,097	201	76,119
Mechanical	0	48	0	48
Improvement Selection cutting	0	0	5,196	5,196
Thinning Even-aged	4,553	596	2,218	7,367
Pruning	0	0	142	142
TOTAL TENDING	32,766	53,554	9,547	95,867
PROTECTION				
Pest control — ground	0	0	10	10
— aerial	0	9,512	15,160	24,672
TOTAL PROTECTION	0	9,512	15,170	24,682
TOTAL TENDING AND PROTECTION	32,766	63,066	24,717	120,549

Protection operations prevent or manage the damage caused by insects and diseases.

Figure 19 summarizes the tending and protection activities conducted on Crown land in 1996/97 for the province and for each MNR region. Reported levels of tending are up almost 30% from the previous period, attributable to the change to more SFL management. The insect protection program in1996/97 was 24,682 ha, less than half the area protected in 1995/96, because of a drop in spruce budworm and jack pine budworm populations.

Renewal Charge Rates:
May 1, 1996 to
March 31, 1997

White and red pine :
$11.00 per cubic metre

All other conifers :
$6.00 per cubic metre

Poplar and white birch:
$0.50 per cubic metre

Grade 1 Hardwoods:
$8.00 per cubic metre

Grade 2 Hardwoods:
$1.50 per cubic metre

Figure 19 Provincial Tending and Protection Activities 1996/97 (hectares)

TENDING	Northwest	Northeast	Southcentral	Province
Cleaning				
Manual	139	1,526	1,194	2,859
Chemical — ground	2,253	1,287	596	4,136
Chemical — aerial	25,821	50,097	201	76,119
Mechanical	0	48	0	48
Improvement				
Selection cutting	0	0	5,196	5,196
Thinning				
Even-aged	4,553	596	2,218	7,367
Pruning	0	0	142	142
TOTAL TENDING	32,766	53,554	9,547	95,867
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Funding for Forest Renewal

The financial mechanisms established under the CFSA and outlined in Chapter 4 ensure that there will always be funding available for forest renewal.

Each company with a Sustainable Forest Licence contributes the appropriate level of renewal charges to an account in the Forest Renewal Trust fund. Funds in the renewal trust may only be used to conduct eligible silviculture work on the specific licence area harvested to generate the funds.

Operators with a Forest Resource Licence who do not operate on an SFL pay their renewal charges into the Forest Renewal Special Purpose Account. This account provides dedicated funding for forest renewal on management units where harvesting and other operations are conducted on Crown land by companies that do not hold Sustainable Forest Licences.

MNR is responsible for the administration of the Forest Renewal Special Purpose Account. As with the Forest Renewal Trust fund, each forest or management unit has its own separate account to cover forest renewal costs.

Money for a third fund, the Forestry Futures Trust, in 1996 came from a portion of the area charges that all licensees must pay to the Crown. In addition, any administrative penalties assessed under the CFSA are paid into the Forestry Futures Trust.

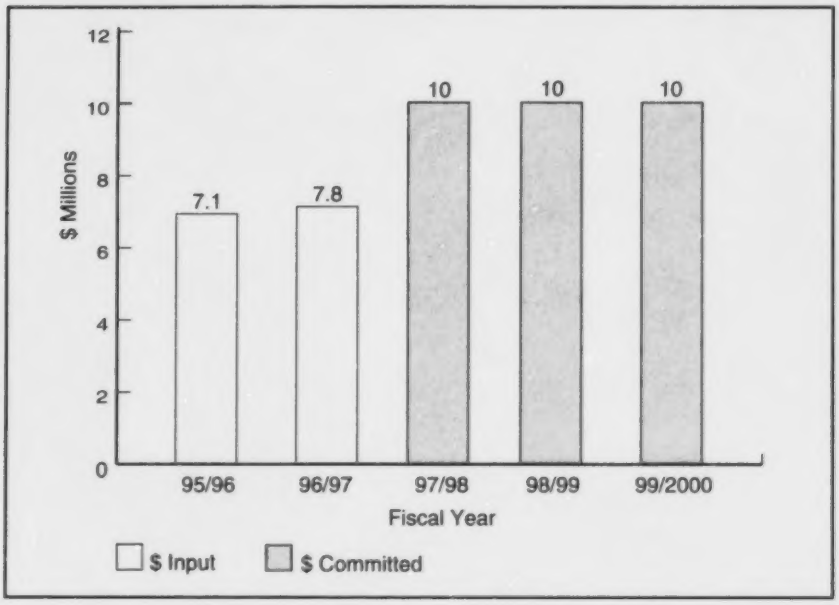
The Forestry Futures Trust, managed by an independent committee established by the Crown, funds projects that meet MNR approved criteria. To qualify, projects must be a silvicultural activity on crown land that addresses: renewal of trees killed or damaged by fire; renewal of land where a licensee becomes insolvent; forest protection from insect or disease infestation; or intensive stand management related to a critical wood supply.

The annual contributions to the Forestry Futures Trust are summarized in Figure 20. The amounts shown through 1996/97 are actual values and the amounts shown after are predictions based on commitments.

In addition to the trust funds and Special Purpose accounts, money was directed from the provincial treasury to MNR supported forest renewal through operation of nurseries, the Ontario Tree Seed Plant, and tree improvement operations.

Figure 20

Forestry Futures Fund: Annual Funds Input or Committed as of April 1, 1997



Total forest renewal expenditures in 1996/97 were $83.8 million. Sources of this funding were:

- Direct MNR expenditures $7.9 million.
- Forest Renewal Trust Fund $44.6 million
- Forestry Futures Trust Fund $9.1 million
- Special Purpose Account $22.2 million

Note: Transition funding not included.

Chapter 7

Most forest access roads on Crown land are planned, constructed and paid for by the forest industry. The forest management plan for each management unit describes the location, construction, maintenance and use management of access roads that exist or are to be constructed. These roads are essential for carrying out forest management activities. They also provide public access to provincial Crown land for tourism, outdoor recreation, mining, and other activities.

This report provides information on the construction of primary and secondary forest access roads. It provides information on road maintenance activities, which include grading, snow plowing, realignments, flood repairs, bridge repairs, and any other activity necessary to maintain existing roads. This chapter also reports on controlling access to roads, implementation of abandonment measures and how this work was funded.

Road Construction and Maintenance

Figure 21 shows total provincial road construction in kilometres in 1995/96 and 1996/97 for primary and secondary forest access roads in each MNR region.

ROAD CLASSES

Primary Roads:
Essentially permanent roads, regularly maintained with a life expectancy in excess of 15 years.

Secondary Roads:
Essentially branches off primary roads. They are not considered permanent and are not normally maintained beyond their 5 to 15 year period of use.

Tertiary Roads:
Built for short-term use (i.e., up to five years). They are not maintained beyond their period of use.

Chapter 7

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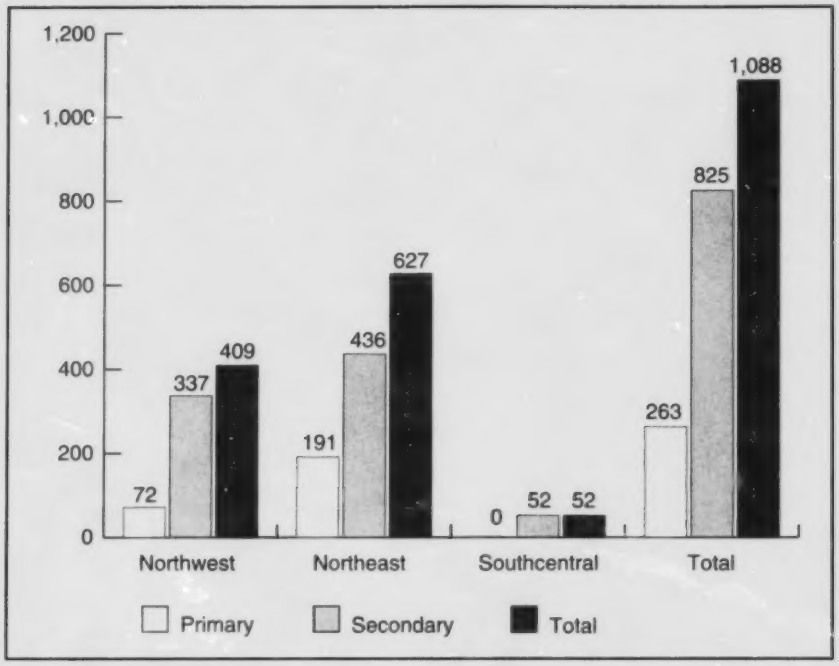
Figure 21
Road Construction (kilometres) 1996/97 by Road Class and MNR Region



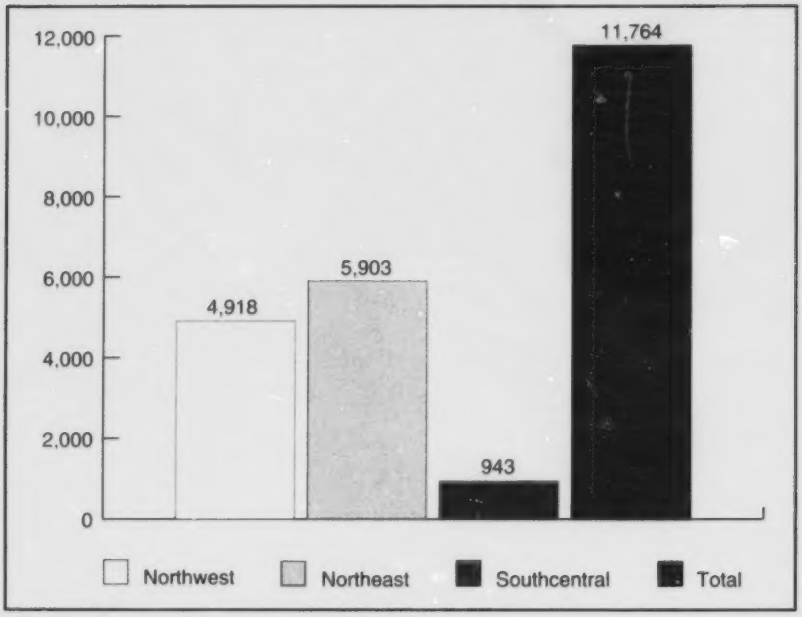


Figure 22
Road Maintenance (kilometres) 1996/97 by MNR Region

Figure 22 shows total provincial road maintenance in kilometres in 1995/96 and 1996/97 for each MNR region.

Total road construction for 1996/97 amounted to approximately 1,088 kilometres, which is about a 6% decrease from the 1995/96 construction total of 1160 kilometres. There were 263 kilometres of primary roads constructed in the province, and 825 kilometres of secondary roads.

Total road maintenance for the year was carried out on approximately 11,764 kilometres of primary and secondary roads which is about a 19% increase in the 1995/96 total of 9,855 kilometres.

In 1996/97 the forest access road construction and maintenance program funded by MNR constructed and reconstructed 150 kilometres of primary

forest access roads in Northern Ontario at a cost of $1.5 million. This work included reconstruction and repairs of 10 bridges and inspections of several others.

Road Abandonment and Access Control

The abandonment of access roads, once their intended use is fulfilled, and restricting road useage, must be planned in advance of construction and documented in the forest management plan for each management unit. These activities must also be reported in the management unit annual report.

Figure 23 shows the total length in kilometres of primary and secondary roads that were abandoned for each MNR region in 1996/97. In total, 1,096 kilometres of road were abandoned. This total was made up of 853 kilometres in the Northwest region, and 243 kilometres in the Southcentral region. There were no road abandonments reported for the Northeast region. The method of abandonment for the majority of these roads was by natural abandonment.

For reasons of public safety and/or resource management, access roads may be closed to the public temporarily, seasonally or on a permanent basis. Methods used to control access can generally be classified into two categories: erecting signs to advise the public of the restriction (referred to as "signage") or; erecting gates or use of other physical means such as ditching (referred to as "gated" or "physical barrier").

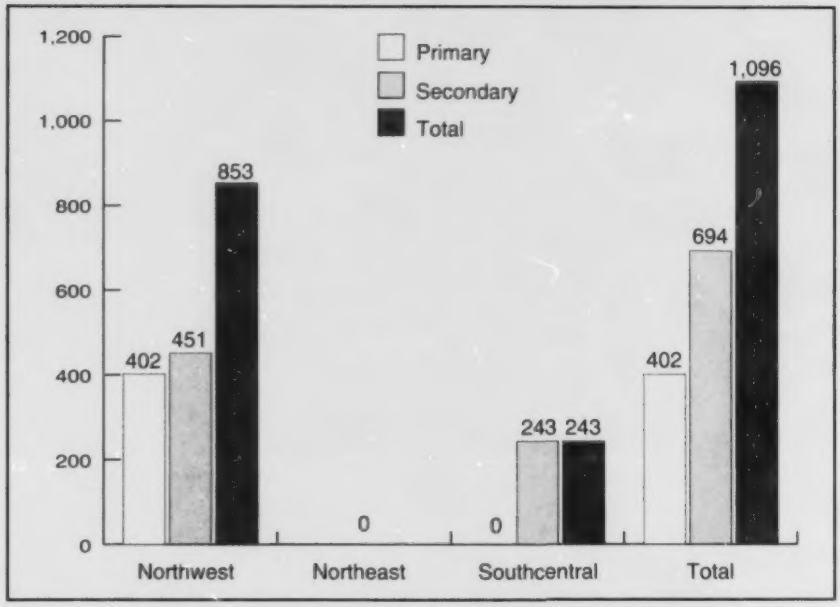
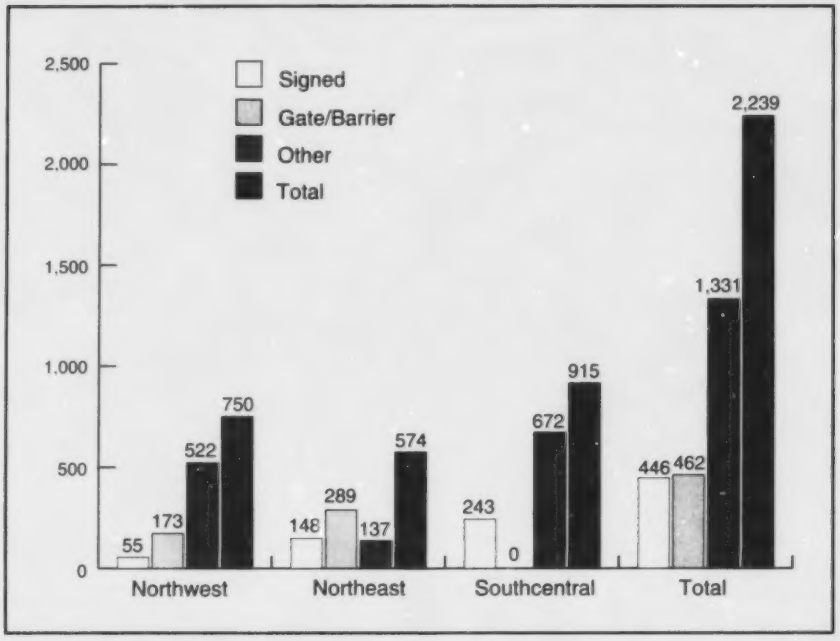


Figure 23
Road Abandonment (kilometres) 1996/97 by Road Class and MNR Region

Figure 24 shows the length of primary and secondary roads in kilometres that had access control during 1996/97 broken down by MNR region and the method by which access was restricted. A total of about 2,239 kilometres of road had access controls which consisted of 750 kilometres in the Northwest region, 574 kilometres in the Northeast region and 915 kilometres in the Southcentral region. Provincially, access was restricted by gating on 462 kilometres of road and by signage on 446 kilometres of road. Another 1331 kilometres of road had access control through unspecified means and are shown as the "other" category in Figure 24.

Figure 24
Road Access Control (kilometres) 1996/97 by Control Method and MNR Region



Chapter 8

Forest operations in Ontario are monitored and audited to assess compliance and evaluate progress and results. There are three types of monitoring: effectiveness, effects, and compliance. The information collected and analyzed for effectiveness monitoring determines how well the forest is growing. Effects monitoring assesses the impacts of operations on various aspects of the forest ecosystem through long term studies. Compliance monitoring is conducted to ensure that MNR and forest industry carry out operations according to plans, regulations and to the required standards. Operations are also audited through Independent Forest Audits (hereafter referred to as audit/audits) providing an independent published audit of management units across the province.

Forest Auditing

The audits are a requirement of the Crown Forest Sustainability Act, Term and Condition 86 of the Timber Class EA Decision and are a condition of the Sustainable Forest Licenses (SFL). All management units, both Crown and SFL, are audited at least once every five years to review actual operations and examine the forest management activities carried out over the previous five years.

The audit is a systematic and documented verification process to assess adherence to the forest management plan and the planning process. Assessing the interpretation and application of provincial policies, manuals, and guidelines at the management unit level, is also part of the audit. Auditors examine the effectiveness in achieving the planned objectives and provide an assessment of forest sustainability for the management unit. Audit teams review licensee compliance with the obligations of their specific Sustainable Forest Licence.

In order to address the audit purpose and objectives the audit protocol document sets out the forest management principles, criteria and procedures for undertaking independent forest audits. The audit protocol identifies eight guiding principles: Commitment, Public Participation, Forest

Management Planning, Plan Implementation, System Support, Monitoring, Achievement of Management Objectives and Forest Sustainability and Contractual Compliance. For each principle, a series of specific criteria are identified that if met, will result in the principle being achieved.

The audit terms of reference are the same for all Independent Forest Audits, including the audit team personnel requirements. Each audit team consists of a lead auditor who is trained in auditing procedures and has current auditing experience, a minimum of two foresters with experience in forest management planning and forest operations, and an individual trained in the forest ecology or wildlife. All members of an audit team must have a minimum of seven years of recent and relevant experience in similar forest types, must be independent of the operations they audit as well as be free from conflict of interest throughout the process. The audit team must include a Registered Professional Forester. For the 1996 audits, the audit team was required to provide an audit against the requirements that were in effect during the audit period and prepare the subsequent report for publication.

Action plans must be developed in response to each audit report. The licensee and the MNR District responsible for the management unit jointly develop the action plan. For each recommendation in the audit report, the action plan must state the action required, the organization responsible for the work, deadline dates, and a method of tracking the progress of the action plan. A status report of the action plan is also required two years after acceptance of the audit report to ensure that progress, as stated in the action plan, is occurring.

In 1996, Independent Forest Audits were conducted on four Sustainable Forest Licence management units: Black Sturgeon Forest, Black River Forest, Spruce River Forest, and the Lake Nipigon Forest. The auditors have indicated that each Forest was managed in compliance in all material aspects with the audit protocol criteria, except for those matters that they have identified in their audit reports as needing improvement. In all four cases the auditors recommended or were in support of licence renewal.

The audit report of **Black River Forest**, managed by Great West Timber Limited, indicated that except for the matters requiring improvement, the Forest was managed in compliance in all material respects with the audit criteria during the five-year period ending March 31, 1996. This audit report identified 5 recommendations for matters requiring improvement. These recommendations have been summarized into the following main

areas: the planning team should be informed of all applicable polices and relevant background information; records should be kept of all by-product deliveries to facilitate compliance with wood directives; all timber harvested must be shipped to market; all planned free-to-grow assessments should be completed and slash which inhibits reforestation should not be left on site; and the Report of Past Forest Operations (RPFO) should discuss progress towards achieving management objectives. A recommendation for license extension was not required, because a new SFL had been issued effective April 1, 1996, prior to the audit. It was important to conduct the audit on this forest to ensure the company continued to meet the terms and conditions of the deemed SFL that was in place during the term being audited and to identify any areas for improvement.

The audit report of the **Black Sturgeon Forest**, managed by Avenor Inc. indicated that the Forest has been managed in compliance in all material respects with the audit criteria outlined in the protocol during the five-year period ending March 31, 1996. This audit report identified 15 recommendations for matters requiring improvement. These recommendations have been summarized into the following main areas: data collection responsibilities between the MNR and the company need to be clarified; Area of Concern (AOC) planning should be improved and implemented as planned; wildlife "leave blocks" should be closely monitored or designated as AOC's; harvest operations should minimize site damage; required reporting tables should be accurate; a systematic ongoing training program for both company personnel and contractors should be developed; those areas set aside for natural regeneration should be annually reported; a review is needed to determine if the original company obligation to treat Not Satisfactorily Regenerated (NSR) lands has been met; and the company and MNR should work towards a new Forest Resources Inventory. License extension was recommended.

The audit report of the **Lake Nipigon Forest**, managed by Domtar Forest Products, indicated that except for the matters requiring improvement, the Forest was managed in compliance in all material respects with the audit criteria during the five-year period ending March 31, 1996. This audit report identified 5 recommendations for matters requiring improvement. These recommendations have been summarized into the following main areas: the chain of command and legal liabilities related to overlapping licensees should be clarified; all timber harvested must be shipped to market; agreement needs to be reached among all road users as to road standards and maintenance responsibilities; and MNR's role regarding

data collection and analysis to validate SFL monitoring programs needs to be clearly defined. Licence extension was recommended.

The audit report of the **Spruce River Forest**, managed by Abitibi-Consolidated Inc. indicated that the Forest has been managed in compliance in all material respects with the audit criteria outlined in the protocol during the five-year period ending March 31, 1996. This audit report identified 14 recommendations. These recommendations have been summarized into the following main areas: procedures need to be formalized regarding road locations around Areas of Concern; compliance needs to be improved, specifically that of overlapping licensees (third party operators); the company and MNR should cooperatively survey areas for new non-timber values prior to the commencement of harvesting operations; site disturbances should be minimized; annual reports should be accurate and descriptive; data for silvicultural regeneration success needs to be collected and up-to-date; a review is needed to determine if the original company obligation to treat Not Satisfactorily Regenerated (NSR) lands has been met; and withdrawals should be monitored to ensure that they remain within the parameters of the established SFL. Licence extension was recommended.

For further information, copies of the 1996 Independent Forest Audit reports are available upon request.

An action plan for each audit report was prepared and approved. These action plans document the corrective actions that will be undertaken in a timely manner. Progress in implementing the audit recommendations through these action plans will be assessed by MNR two years after the action plans have been approved.

There are ten Independent Forest Audits planned for 1997. Seven of the audits will be of Sustainable Forest Licenses, namely the Pineland, Superior, Romeo Malette, Nagagami, Highrock, Lac Seul and Hearst Forests. As well there will be three audits of non-SFL management units, Algonquin Park, Mississagi, and Sapawe Management Units. The results of these audits will be published upon completion.

Compliance Monitoring

Compliance monitoring is designed to ensure that MNR and forest industry carry out operations according to plans and operational standards. At the management unit level, MNR prepares a report of the forest operations inspections. These reports assist in focusing on any activities that may require further attention.

MNR has been solely responsible for forest compliance monitoring in the past. In 1996/97 changes to forest compliance monitoring were proposed that permitted MNR to meet the requirements of CFSA and Term and Condition 78 of the Class Environmental Assessment on Timber Management while increasing the roles and responsibilities of forest industry.

In November 1996 seven forest companies, along with their MNR District counterparts worked with the provincial compliance team to mutually test, operationalize and make amendments to the compliance planning, inspection, monitoring and reporting systems. These seven case studies continued into 1997/98 to help refine the system and to prepare for provincial wide implementation for April 1998.

In 1996/97 a total of 3,509 forest operations inspection reports were submitted by seventy-two reporting management units. These reports contain the results of MNR forest operations inspections and industry conducted compliance inspections from the seven case-study management units.

A total of 43 infractions resulted in penalties being assessed. There were 38 penalties relating to harvesting operations and 5 penatlites associated with forest access operations.

Penalties include those made through the CFSA or other legislation, e.g. Public Lands Act, as appropriate. Penalties also include; "stop work orders", "repair orders" or "compliance orders" that are directed at preventing, stopping and repairing damage.

Compliance inspections of road water crossings, conducted during 1996/97 recorded 91 washouts. Washouts can occur due to a number of factors including natural causes such as flooding and blockage due to beaver activity, and poor road construction techniques.

Effectiveness Monitoring

Effectiveness monitoring collects and analyses information to determine the progress in regenerating the forest. Free-to-grow assessments are an effectiveness monitoring tool that provides an indication of success of the silviculture treatments and provides information to project the future forest condition.

Reports were submitted by 75 management units, of which forty four were nil reports, i.e. no area assessed. This portrays an inaccurate view of the regenerating forest and MNR is currently working to address the problems of data collection and reporting of effectiveness assessments.

Figure 25 summarizes the areas declared free to grow for 1996/97 by region for the thirty one management units reporting. Of the total area assessed for free-to-grow, 85% was approved as having achieved the free-to-grow standard. This varies by region, from 91% in the Northeast Region, and 80% in the Northwest Region, to 63% in the Southcentral Region.

Effects Monitoring

Effects monitoring is a long term assessment of potential forest management impacts on the forest ecosystem. The summary of research activities and scientific studies for 1996/97 pertaining to forest operations and practices is presented in Chapter 10. As part of MNR's adaptive management practices, the results are used to update existing and prepare new guidelines and policies.

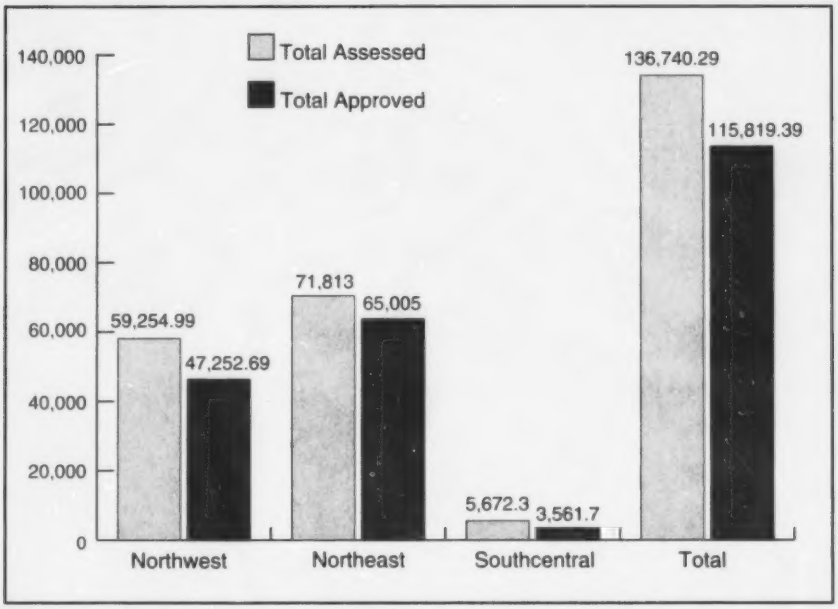


Figure 25

Summary of Area (hectares) Declared Free-To-Grow by MNR Region 1996/97

Chapter 9

Introduction

The Term and Condition numbered 77 (T&C #77), of the Class Environmental Assessment for Timber Management on Crown Lands decision requires the Ministry of Natural Resources (MNR) to negotiate with Aboriginal peoples at the local level regarding opportunities for a more equal participation in the benefits of forest management. In referring to Aboriginal peoples, the decision includes communities, individuals, enterprises, and organizations.

The wording of T&C #77 is as follows:

> *"During the term of this approval, MNR District managers shall conduct negotiations at the local level with Aboriginal peoples whose communities are situated in a management unit, in order to identify and implement ways of achieving a more equal participation by Aboriginal peoples in the benefits provided through timber management planning. These negotiations will include but are not limited to the following matters:*
>
> *a) Providing job opportunities and income associated with bush and mill operations in the vicinity of Aboriginal communities.*
>
> *b) Supplying wood to wood processing facilities such as sawmills in Aboriginal communities.*
>
> *c) Facilitation of Aboriginal third-party licence negotiations with existing licensees where opportunities exist.*
>
> *d) Providing timber licences to Aboriginal people where unalienated Crown timber exists close to reserves.*
>
> *e) Development of programs to provide jobs, training and income for Aboriginal people in timber management operations through joint projects with the Department of Indian and Northern Affairs.*
>
> *f) Other forest resources that may be affected by timber management or which can be addressed in the timber management planning process as provided for in Condition 23(c)."*

Implementation

The scope of T&C #77 is broad, and its application and implementation are determined by variables at the local level. The arrangements and agreements that are effected by MNR District managers and Aboriginal communities take different forms, in an effort to accommodate to the extent possible the unique needs, capacities, and situations of individual Aboriginal communities in the context of available opportunities.

Implementation elements under T&C #77 may include the involvement of individual Aboriginal communities, or groups of communities with common interests that are situated in a common geographic area. Linkages with Tribal Councils and regional organization representatives are taken into consideration and encouraged as the Ministry of Natural Resources and the forest industry address the requirements of the Environmental Assessment Board's decision.

In its decision, the Environmental Assessment Board ordered MNR to build upon initiatives it was already pursuing and to provide new opportunities for Aboriginal peoples that will enable them to benefit from forest management activities in their locales.

In January 1996, MNR released draft "Implementation Guidelines for Term and Condition #77 of the Class Environmental Assessment." The purpose of these guidelines is:

- to provide MNR District Managers with a consistent framework for the implementation of T&C #77 that builds upon existing initiatives and facilitates the development of new initiatives
- to provide Aboriginal communities and forest industry companies with the information MNR District managers will use in the implementation of T&C #77

MNR implements T&C #77 consistent with the Crown Forest Sustainability Act (CFSA), which provides MNR's legislative authority for the sustainable management and use of forest resources. The CFSA has enabled MNR to put mechanisms in place that may assist in facilitating the implementation of T&C #77.

While responsibility for implementation of T&C #77 rests with MNR, the Environmental Assessment Board recognized that the involvement of other parties would be crucial to success in this matter. Such involvement requires effective coordination and cooperation of First Nations and other

Aboriginal communities, the forest industry, and other government bodies (e.g., Ontario ministries, Department of Indian and Northern Affairs Canada, Natural Resources Canada).

The year 1996/97 was the second year of implementation for Term and Condition #77. It was also the year that the Crown Forest Sustainability Act was introduced and Sustainable Forest Licences became a priority for MNR Districts. In negotiating SFL's, MNR requires the increased involvement of the forest industry in providing economic development opportunities to First Nation communities. During 1996/97, MNR, the forest companies and Aboriginal communities faced significant challenges to fully pursue forest management opportunities under T&C#77.

Upon successful completion of the transfer of forest management operations, forest companies have full authority to provide Aboriginal communities with increased access to harvesting, silvicultural contracts, road construction/maintenance projects, training and employment. It is anticipated that business-to-business negotiations between First Nations and forestry companies will increase over the next few years.

District Progress

The following District by District summaries are for the period April 1, 1996, to March 31, 1997, only. Of the twenty-six MNR Districts across the Province, five are outside the area of the undertaking these being Aylmer, Aurora, Cambridge, Midhurst and Peterborough.

Where details involve private business information, this report cannot be explicit in reporting the names of companies or First Nations or the business arrangements between them including contractual commitments, wood allocations, and other business activities. Confidentiality considerations provide for the reporting of negotiated business arrangements on a general level or as an aggregate total for all First Nations and forest companies within the District boundary.

Summary descriptions of the results of negotiations between Aboriginal communities and the forest industry, by MNR Districts follow:

Algonquin Park

Management Unit: Algonquin Park Forest

There are no First Nations or other aboriginal communities situated within the Algonquin Park Forest. However, Algonquin Park is part of the

traditional territory of several Algonquin communities surrounding the provincial park including Golden Lake, Mattawa, Bancroft, Whitney, Sharbot Lake and Ottawa. Portions of the park are also included in the Robinson-Huron and Williams Treaty areas.

Ontario and the Federal Government are engaged in land claim negotiations with the Algonquins of Ontario. Discussions continue with the Algonquins on forest related economic opportunities as part of the ongoing land claim negotiations. It is anticipated that Aboriginal communities will increase their level of participation in forest management once the land claim is finalized.

Several Algonquin community members are employed in sawmill and woodland operations that harvest timber from Algonquin Park. In addition, the Algonquin Forestry Authority (AFA), has been and continues to enter into contractual arrangements for road maintenance and silvicultural work with individual Algonquins and with community economic development corporations. The AFA and Algonquin Park also completed an employment and educational arrangement with several Algonquin students through the Sault College Aboriginal Resource Technician program.

Bancroft District

Management units: Bancroft, Minden, Mazinaw

Much of Bancroft District lies within the traditional territory of the Algonquin peoples. Three groups of Algonquin peoples are resident within the District; those at Whitney, Bancroft and at Sharbot Lake. During 1996/97, these groups were not participants in forest management activities on Crown Lands within Bancroft District, although a significant number of people of Aboriginal heritage are amongst the workforce employed by the forest industry in two of the mills that lie within the Bancroft District.

Chapleau District

Management units: Superior Forest, Pineland Forest, J. E. Martel Forest, Upper Spanish Forest

Three First Nations communities, Brunswick House, Chapleau Cree, and Chapleau Ojibway are located in the District. Two other communities the Missanabie Cree, and Michipicoten First Nation have participated in forest management planning in the District.

Aboriginal communities were invited to participate in the preparation of a Native background information report. The opportunity for a separate Native consultation process was provided and one First Nation participated in the process.

Interest was expressed in participation in the joint development of a training centre.

Some members of Aboriginal communities have either established forest businesses or are considering establishing them to conduct harvesting, silvicultural activities, road construction and maintenance. Forest companies continue to discuss forest management opportunities and negotiate access to economic development opportunities with Aboriginal people. Ecotourism initiatives are in the early development stages.

Cochrane District

Management units: Cochrane, Driftwood Forest, Iroquois Falls Forest, Moose River, Smooth Rock Falls Forest

Although seven First Nation communities (Attawapiskat, Fort Albany, Fort Severn, Kashechewan, Moose Cree, New Post, and Weenusk) lie within the Cochrane District only one, New Post , falls within the area of the undertaking. Moose Cree's traditional territory stretches south into the area of the undertaking. The District includes Moose Factory and Mocreebec in negotiations on T&C#77. As well, Wahgoshig First Nation's traditional territories stretch north from Kirkland Lake District into Cochrane District and the First Nation is active in forest management discussions within the District.

Native values mapping was contracted to a First Nation under the Forest Management Planning (FMP) process. A band member was identified to participate on the local citizens committee (LCC) and on a regional technical committee.

Two separate letters of intent between two First Nations and a forest company were signed. The letters of intent confirmed a desire by the parties to negotiate a harvesting agreement, to co-operate in the development of a business plan, define harvesting areas and a training program, and to develop roles and responsibilities for a First Nation liaison officer to work with industry and Aboriginal communities in all areas of forest operations.

Approximately 22,000 cubic metres of timber was provided to First Nations through overlapping licences to harvest both conifer and hardwood.

Additional harvesting opportunities were declined by First Nations pending resolution of outstanding issues and for other operational reasons.

Hiring opportunities were provided to Aboriginal people.

A forest company and Northern College cosponsored heavy equipment training for twelve members of a First Nation. As well, a company sponsored a native technician through Sault College. Supervisory training was provided to two band members on two management units. Two Aboriginal people were trainees in bush operations.

Dryden District

Management units: Dryden, Wabigoon Forest, English River Forest

Two First Nations are located in the Dryden District these being Eagle Lake and Wabigoon. Saugeen First Nation and Lac Seul in the Sioux Lookout District, contacted industry in Dryden District to discuss forest management opportunities.

Dedicated wood allocations were identified through the forest management planning process. Over 35,000 cubic metres were allocated to Aboriginal companies. Additional allocations are being considered.

It's estimated that over forty Aboriginal people work for the forest industry in the District. Aboriginal businesses entered into pre-commercial thinning operations that provide seasonal employment to approximately twenty First Nation members.

A graduate of Sault College Native Resource Technician program was hired. As well two native co-op high school students were sponsored.

Fort Frances District

Management units: Seine River Forest, Sapawe, Manitou Forest, Fort Frances, Flanders

Seven First Nations are located in Fort Frances. These are Couchiching, Lac La Croix, Naicatchewenin, Nicickousemenecaning, Rainy River, Seine River, and Stanjikoming First Nations.

Ongoing discussions between First Nations and forest industry include the signing of a Memorandum of Understanding with a First Nation that sets the framework for involvement in forest management within an SFL. A joint steering committee was formed to guide the process.

Over 200,000 cubic metres of wood were designated for Aboriginal communities.

Financial assistance was provided to hire an Aboriginal fire crew. One First Nation member trained as a forest technician and worked on planning and SFL transaction issues.

Under a formal agreement a training centre was constructed and equipped.

It is estimated that over 150 Aboriginal people were employed in the forest industry in the District.

Negotiations resulted in a strategic business alliance between the forest industry and a First Nation. In some cases First Nations were active in forestry operations including silviculture, flagging, self-compliance monitoring etc. In one case, a First Nation having gained significant experience in road construction held large road construction contracts with MNR for two years and is now establishing a Development Corporation to assume heavy equipment contracts.

Approximately $300,000.00 in forest management contracts were awarded to Aboriginal businesses.

Hearst District

Management units: Gordon Cosens Forest, Hearst Forest, Kapuskasing

Constance Lake is the only First Nation in the District.

A councilor from Constance Lake has a designated position on the executive of the Hearst local citizen committee (LCC). As well a position was available for an Aboriginal member to participate on the FMP planning team. A native consultation process was developed and implemented.

Significant funding was provided to complete Native Values mapping. Final reports are pending and anticipate completion in 1997/98 and beyond.

A joint venture between the forest industry and a First Nation was discussed. An allocation was arranged between two forest companies and this First Nation. The First Nation also has an annual allocation of softwood with a third forest company.

Aboriginal fire fighters were employed by the MNR to provide fire suppression services in Ontario. Fire suppression training programs were available to First Nation members.

Training of Aboriginal cut and skid crews occurred in the fall 1996. As well a member of the First Nation was provided FMP training.

Employment opportunities are increasing as new jobs in trucking and harvesting were created for First Nation members.

Kenora District

Management units: Kenora, Patricia Forest

Fourteen First Nations communities are located in Kenora District, these being Big Grassy, Big Island, Dalles, Grassy Narrows, Northwest Angle #33, Northwest Angle #37, Ojibway of Onegaming, Rat Portage (Wauzhushk Onigum), Shoal Lake #39 (Iskutewisakaygun), Shoal Lake #40, Wabaseemoong, Wabauskang, Washagamis Bay, and Whitefish Bay First Nations.

Forest industry representatives have discussed forestry opportunities with several of the First Nation communities. These discussions centered on licences, volumes, job creation, and training. A company representative facilitates communications with the First Nations to develop a strategy to achieve economic development and employment benefits.

During 1996/97, Forest Resource Licences, tree planting and tending contracts were provided to First Nation communities. Wood allocations of approximately 15,000 cubic metres created fifteen jobs. Two First Nations obtained licences for 4000 cords of wood. Three First Nations have access to timber licences.

Financial assistance was provided to First nation company to assist in establishing office space.

Contracts to Aboriginal business included planting 47,210 trees, and a road right of way clearing totaling over $50,000.00.

A joint project, between MNR and a First Nation, was established to collect oral history.

Kirkland Lake District

Management units: Elk Lake, Iroquois Falls South, Walter L. Plonski Forest, Timiskaming, Watabeag

Three First Nation communities, Wahgoshig, Beaverhouse and Matachewan Indian Reserve are located in the Kirkland Lake District. As well Bear Island and Mattagami communities are active in forest management in the District.

A First Nation was active in negotiations with the local forest industry and MNR and was issued a timber licence for 7160 cubic metres of wood in 1997/98.

Silvicultural activities were pursued by the First Nation and its members expressed interest in expanding these activities. A silvicultural contract valued at $25,000.00 was awarded to a First Nation.

Parry Sound District

Management units: Bracebridge, Georgian Bay

Six First Nations are in the Parry Sound District. These are Henvey Inlet, Magnetawan, Moose Deer Point, Shawanaga, Wahta Mohawks, and Wasauksing. As well, Dokis First Nation is active in forest management in the District.

Seven First Nations were contacted as part of the consultation process for the 1999/2004 forest management plan (FMP). Communities participating in consultations expressed an interest in employment, training and development opportunities. A First Nation representative participates on the FMP process.

One Aboriginal entrepreneur held a timber licence for 800 cubic meters, creating three seasonal jobs during 1996/97.

One community was involved in the development of a native background information report. Currently, one community has a member on the local citizens committee.

Industry was involved in negotiating a training program with one First Nation. The District makes in-house training available to First Nation people.

Pembroke District

Management units: Pembroke

The Algonquins of Golden Lake First Nation (AGLFN) is the only First Nation in the District. They have been active in forest management and harvesting, including participation in Sustainable Forest Licence negotiations. Discussions with respect to licensing the timber allocation of 500 hectares outlined in the 1996 to 2001 Forest Management Plan occurred. This allocation translates into an annual average of 100 hectares. A First Nation affiliated forest operator, also obtained a small licence on Crown land and four agreements for the sale of timber on Renfrew County Forest.

Two First Nation affiliated forest operators were the successful bidders on tenders that provided them with silvicultural contracts valued at $14,500.00. Ontario Native Affairs Secretariat (ONAS) and MNR provided a report to industry and First Nations outlining potential business opportunities in the silvicultural services industry. Two band members attended the Provincial Tree Marker Licensing course.

A First Nation company was involved in setting up a tree nursery on the former nursery site at the Petawawa Research Forest. The District provided technical advice on this initiative.

It is estimated that 16 aboriginal people worked in mills and bush operations for the major licensees operating on crown land. There are likely other aboriginal people employed in mills relying on private land wood supply and bush operations on private lands but figures are not available for these areas.

North Bay District

Management units: Temagami, Nipissing Forest

Three First Nation communities are located within North Bay District. These are Teme-Augama Anishnabai, Dokis, and Nipissing. A Metis community, the Algonquins of Golden Lake (Mattawa community), are located in the District.

Three Aboriginal communities participated on the forest management planning teams. Native background information reports are under development.

Two timber licences were issued to two First Nations to cut 7500 cubic meters of wood in 1996/97. Additional allocations are available over a five year period. There are approximately twelve jobs associated with the licences.

A $60,000.00 silvicultural contract was provided to a First Nation. As well, a three year proposal for $3.6 million to conduct 9,000 ha. of pre-commercial thinning was under development.

Three First Nations members were scheduled to attend a tree marking certification course.

Nipigon District

Management units: Auden Forest, Nipigon, Lake Nipigon Forest, Nakina Forest, Longlac Forest, Geraldton, Steel River, Nakina North Forest, Ogoki Forest, Part of Black Sturgeon Forest.

Sixteen First Nations are located in the Nipigon District. These are Aroland, Sand Point, Eabametoong, Ginoogaming, Kasabonika Lake, Lake Nipigon Ojibway, Lansdowne House, Long Lake 58, Marten Falls, Nibinamik, Ojibways of the Pic River, Pays Plat, Red Rock, Rocky Bay, Wunnumin, and Webequie First Nations. Of the sixteen First Nations, 11 are within the area of the undertaking or have traditional territory within the area of the undertaking.

A forest company, as a condition of a license, is required to work with local First Nation communities to develop a "Native Recruitment, Training and Employment Strategy" and a "Strategy for Creating Business Opportunities for Natives". The company created the "First Nations Training and Development Program," "First Nations Recruitment Plan" and "First Nations Business Development Plan".

A forest company must work cooperatively with the Crown to provide opportunities to three First Nations to negotiate overlapping agreements for areas to be harvested under the terms of a Forest Resources License(s).

First Nations participated in the forest management planning process as a members of the planning team. In some cases Aboriginal communities declined to participate on the forest management planning team.

Aboriginal-operated businesses are licensees on an SFL. The companies negotiated operating principles including continuation of their licenses; participation in all phases of forest management planning and reporting; opportunities to increase share of harvesting; first right of refusal to carry out forest renewal work based on cost competitiveness; and the forest management unit would be renamed The Pic River Ojibway Forest.

In seven Forest Management Units discussions with First Nations included the review of potential business, employment, planning, harvesting, silvicultural and licensing opportunities. Council representatives participate in the FMP process and Native value information collection. In some instances there is ongoing liaison with forestry consulting firms retained by Aboriginal communities.

First Nations contracting opportunities include a 50,000 tree plant contract and forest assessment contracts. Over $100,000.00 in contracts were awarded to Aboriginal businesses in 1996/97.

Harvesting allocation commitments were negotiated with First Nations for extended terms of up to five years. A forest company has an arrangement to obtain 20,000 cords from a First Nation supplier. As well, allocations of over 100,000 cubic metres of wood were provided to Aboriginal communities and businesses.

It is estimated that over 200 Aboriginal people are employed in the forest sector in the Nipigon District.

A Forestry Futures Trust Project was initiated with a First Nation as the MNR partner implementing the forest renewal contracts. This potentially involves over $650,000.00 in silvicultural contracts over three years.

MNR and a forest company sponsored Aboriginal Resource Technician students attending Distance Education Program at Sault College.

Red Lake District

Management units: Trout Lake Forest, Red Lake

Seven First Nations are located in Red Lake District. These being Deer Lake, Kee-Way- Win, MacDowell Lake, North Spirit Lake, Pikangikum, Poplar Hill, and Sandy Lake. Only a small portion of the Pikangikum traditional use area is within the area of the undertaking. Two First Nations outside the District boundary were active in forest management in the District.

It is estimated that over 100 Aboriginal people work in the forest industry within the Red Lake District.

Two First Nations held overlapping licences in the District.

A forest company produced and implemented a report entitled "A Strategy for First Nation Recruitment, Training and Employment and Business Opportunities," in conjunction with a conditional wood supply agreement. Under the agreement First Nations people received training on their respective reserves and subsequently obtained jobs at local wood processing facilities.

Sault Ste. Marie District

Management units: Algoma, Mississagi

Five First Nation communities are located within Sault Ste. Marie District. These being the Ojibways of Batchewana, Garden River, Thessalon, Mississauga, and Serpent River.

An Aboriginal organization participated as a member of a local citizens committee that provides advice to the planning team preparing forest management plans (FMP).

The forest industry met with all First Nations to discuss forest management plans and to review forest management opportunities. A timber licence was issued to an Aboriginal logger for 100 ha. A small pre-commercial thinning project was completed by an Aboriginal organization that provided short term employment for three Aboriginal people. A number of cone collection contracts were issued to local First Nation members.

A jointly funded road project was negotiated between a First Nation and the forest industry. During the road negotiations, future First Nation timber allocations were also discussed.

Two native staff from an Aboriginal council attended a tree marking course. MNR loaned geographic information system (GIS) equipment to the council for training purposes.

Sioux Lookout District

Management units: Caribou Forest, Lac Seul Forest, Sioux Lookout Forest

There are thirteen First Nation communities located in the Sioux Lookout District. These being Bearskin Lake, Big Trout Lake, Cat Lake, Kingfisher Lake, Lac Seul, Mishkeegogamang, Muskrat Dam, New Slate Falls, North Caribou Lake, Ojibway Nation of Saugeen, Sachigo Lake, Wapekeka and Wunnumin Lake. Of the thirteen First Nation communities in Sioux Lookout District, Lac Seul, New Slate Falls and the Ojibway Nation of Saugeen are the only ones located within the area of the undertaking. Cat Lake and Mishkeegogamang who are outside the area of the undertaking but near existing forest management units were invited to participate in the FMP process.

Sioux Lookout's LCC membership includes representation from one First Nation community. Two other First Nations were asked to participate as members of the LCC.

MNR had preliminary discussions with two First Nations interested in pursuing opportunities.

The local forest industry, First Nations and MNR discussed forestry-related opportunities for the First Nations. Timber allocations are available to First Nations.

It is estimated that one company provides sixty jobs to Aboriginal people in harvesting, road construction, and mill operations.

Training in forest and transportation operations are obligations a company made under agreement with a First Nation. Aboriginal communities continue to negotiate for increased access to opportunities.

A small sawmill was operated by a member from a First Nation. The sawmill provides lumber products for local community and mining needs.

MNR supported the education and training of an individual in the Native Technician/Distance education program. Four community members were trained in this program. Aboriginal loggers continue to be trained in logging practices and regulations.

Sudbury District

Management Units: Sudbury, Lower Spanish Forest, Spanish River

Ten First Nations are within Sudbury District. These being Cockburn Island, Sagamok Anishnawbek, Sheguiandah, Sheshegwaning, Sucker Creek, Wahnapitae, West Bay, Whitefish Lake, Whitefish River, and Wikwemikong.

Funding assistance was provided for education and training of two Aboriginal students. A three year co-op placement for one Aboriginal technician was established.

Over 125 Aboriginal community members, from within the District, were employed as seasonal fire fighters in Ontario.

MNR assisted Aboriginal communities with the development of a business plan, training strategy and a forest strategy.

Two seasonal Aboriginal students were hired to collect values mapping and monitor forest operations.

Access to forest management opportunities provided through licensing and allocations include the following:

- 100 hectare timber licence
- five year timber allocation of 560 hectares
- tree planting contract 20 hectares, 43,000 trees, 8 seasonal jobs
- 20 hectare training site established

A forestry company with a SFL comprising of ten licensees, was required to include the Aboriginal communities in its forest management planning process. One First Nation is an established licensee that employs native staff in supervisory and operational roles.

Two First Nations are members of a forest company's advisory committee established to employ native people in bush operations. As well, the forest company made arrangements for a local Band to harvest wood from its private land.

Thunder Bay District

Management units: Dog River-Matawin Forest, Lakehead Forest, Spruce River Forest, Brightsand Forest, Part of Black Sturgeon Forest, Armstrong Forest, Kiashke River Forest.

First Nations located within Thunder Bay District include Fort William, Whitesand, Lac Des Mille Lacs and Gull Bay.

A First Nation in Thunder Bay District participated as a representative on the Forest Management Planning Team. Another was a participant in the native consultation program, and prepared final Native background information report and Native values map under contract from MNR. One First Nation was an active member on a local citizen's committee while another was a non-active member on an LCC.

A member of a First Nation attended a timber scaling course. Fire suppression training courses were available to, and were attended by, First Nation members.

Contracts to plant 347,000 trees, collect 50 hectoliters of cones, and thin 50 hectares were awarded to First Nations. Forest companies discussed

subcontracting opportunities for site preparation, tree planting, cone collection and tending programs with interested First Nations. One Aboriginal business has an annual silviculture contract of over $100,000.00. One First Nation has an annual silviculture contract of $90,000.00.

Two Aboriginal businesses hold overlapping Forest Resource Licences (FRL) with annual allocations of over 135,000 cubic metres of wood. One First Nation has an overlapping FRL for 31,000 cubic metres annually and a subcontract to harvest over 75,000 cubic metres of wood. Discussions between Aboriginal communities and the forest industry continue to identify forest management opportunities.

Two First Nations were in discussions with MNR and forest companies for bait fish and tourism opportunities.

Timmins District

Management units: Romeo Malette Forest, Shining Tree, Timmins Forest, Timmins, Pineland Forest.

The Mattagami First Nation is the only First Nation in the District but other First Nations outside the District are active in forest management in the District.

A First Nation was active in discussions regarding the Shining Tree SFL and the Romeo Malette Forest.

A First Nation was interested in potential silviculture, harvesting, and hauling activities. The Band also sought funding to hire a resource management liaison person to pursue, with the SFL holder, forest-related employment opportunities for band members. Another First Nation was contracted to carry out site preparation work worth $13,000.00.

A graduate of the Aboriginal Forest Technician Program was hired by a First Nation to meet their resource management liaison requirements. MNR made facilities and equipment available to the liaison officer to train twelve band members in forest technology.

Over twenty-five Aboriginal people from within the District were involved in provincial forest fire suppression activities. Fire fighting training was available to First Nations members.

Two Aboriginal communities participated in Native consultation during the 1997 forest management plan preparation.

Wawa District

Management units: Big Pic Forest, Black River Forest, Magpie Forest, Nagagami Forest, Wawa, White River Forest

Three First Nations are located within Wawa District, these being Michipicoten, Pic-Mobert, and Hornepayne First Nations. An Aboriginal community outside the District participated in forest management activities in the District.

There was ongoing participation by First Nations in the forest management planning process.

Up to thirty-five Aboriginal people have permanent jobs at a mill in Hornepayne. Seasonal employment was provided through cone collection and tree planting contracts. A logging contract to cut up to 87,000 cubic metres of wood was provided to two communities.

MNR facilitated meetings between the forest industry and First Nations for overlapping timber allocations.

Chapter 10

Through specific scientific research, technical development programs and policy development programs, MNR will keep pace with the ever-expanding knowledge base for sustainable forest management.

The programs span a wide range of subjects including areas such as the development of better data and information sources, the creation and implementation of new policies, procedures and guidelines for management planning, the development of new forest management methods, models and tools, and continuing long-term scientific studies.

This chapter outlines MNR's progress, in conjunction with its partners, on these scientific, technical and policy programs up to 1996/97.

New and Improved Data and Information Sources

T&C # 81 Provincial Wildlife Population Monitoring

Since 1990 MNR has worked in partnership with the federal government and non-government organizations to gain access to information and to expand the monitoring programs for a variety of wildlife species. Some of the program monitoring partners include the Long Point Bird Observatory and the Thunder Cape Bird Observatory and Canadian Wildlife Service. Species to be monitored include selected hawks and falcons, owls, songbirds, frogs and small mammals.

MNR established a system of regional wildlife assessment units in 1995/96 and work in 1996/97 focused on planning the direction for the Wildlife Assessment Program. Staff are in the process of focussing in on key species to monitor and developing monitoring methods to be used.

The Fish and Wildlife Aging Unit, Northwest Science and Technology, continues to assist in the science function of describing wildlife and fisheries populations.

T&C # 96 Silvicultural Effectiveness

To improve the assessment, recording and reporting of silvicultural effectiveness related to both natural and assisted renewal methods, forest operations prescriptions are a requirement of the Forest Management Planning Manual which was approved in September 1996. A prescription is a site-specific, integrated set of harvest, renewal and maintenance activities that must be developed before any operations may begin on a particular site. A Registered professional Forester must certify a prescription.

Work is ongoing on the development of a draft Free-Growing Regeneration Assessment guideline which will provide direction for forest managers on assessing renewal success.

T&C # 97 Forest Ecosystem Classification Program

The Ecological Land Classification (ELC) program has been developed to provide consistent approaches to the description, classification and inventory of Ontario's diverse ecosystems. Resource managers will have a variety of interpretations for resource management decision making, based on province-wide ecosystem classifications.

A principal focus of the program is the completion of detailed ecosystem classifications for the forested and wetland ecosystems throughout the province. The ELC program has completed classifications for the forested portions of Northeast, Northwest, and Central Ontario.

A number of ELC interpretation manuals have been produced or are under development, including field guides for Northeast and Northwest Ontario and wetland ecosystem classifications for Northwest Ontario.

A centralized provincial ecological data repository has been established to contain standardized ecological plot data. The repository provides ready access to ecological plot data to support ELC and other collaborative research and interpretation development projects. Currently, the repository contains over 6,000 plot records.

A number of developments to improve inventory and mapping technologies are ongoing which investigate Geographic Information Systems (GIS) and Remote Sensing technology for mapping ecosystems.

Technology transfer and training programs for resource practitioners are continuing.

T&C # 99 Areas of Natural and Scientific Interest (ANSIs)

ANSIs are areas of land and water containing natural landscapes or features that have been identified by MNR as needing protection of such values as natural heritage appreciation, scientific study or education. ANSIs are classified as either Life Science, Earth Science, or combined. ANSIs are protected during forest management planning through the area of concern process.

Life Science

Analyses of unrepresented landform/vegetation features at the Site Region scale were completed (Site Regions 0E, 1E, 2W, 3E, 3S, 4E, 4S, 4W, 5E, 5S). These analyses provide background information that was helpful in the prioritization of Site District work, and serve to indicate where major gaps exist (at a very coarse scale).

Biophysiographic analyses were completed for Site Regions 3S and 5S. Gap analysis studies were initiated for Site Districts 3S-1, 5S-1, and 5S-2, as a follow-up to the biophysiographic analyses for these two Site Regions.

A GIS-based method for conducting gap analysis on large electronic databases was developed. This was based on the method that had been applied manually in Site District 4E-3 (completed in 1995/96). Additional gap analyses were initiated in Site Districts 3E-3, 3E-5, and 4E-2, using this automated methodology. In partnership with Parks Canada, gap analysis projects were also initiated in Site Districts 3W-3 and 3W-5. Updates and revisions were begun in Site District 5E-1. Revisions and additions to the Nature Reserve Zoning in Arrowhead Provincial Park (Site District 5E-8) also were completed.

Earth Science

During 1996/97, work planning and priority setting for earth science work to be conducted in the Area of the Undertaking were completed.

The development of a gap analysis methodology analogous to the life science methodology, but based on provincial geological themes, was begun. An earth science systems plan for selected geological themes in central Ontario was also completed during the 1996/97 fiscal year.

An earth science inventory of Wasaga Beach Provincial Park was completed (just south of the Area of the Undertaking).

T&C # 100 Growth and Yield

The Forest Growth and yield Program was established in 1991 to provide forest managers with better information on the growth and dynamics of Ontario's forests. Beginning in 1992, a province wide network of permanent sample plots (PSPs) was established over a range of forest site and management conditions. Data collected from these plots provide information to forest managers on site and soil conditions, vegetation composition, tree growth, tree mortality and regeneration and wildlife habitat in Ontario's forests. The program established approximately 1,100 mortality plots and 3,300 growth plots during 1992-96. The data being collected from all PSPs are the basis for the development of new models for predicting forest stand growth and a provincial monitoring program. Plot remeasurement was underway in 1996/97.

Work is ongoing with the production of Density Management Diagrams (DMDs) which are forest management tools that assist forest managers in understanding growth and yield dynamics within forest stands. A DMD helps a manager to predict the structure development of fully stocked stands. A diagram provides information on average tree volume, stand height, average tree diameter, and stand density and mortality at various stages of stand development.

Work is underway with modelling activities associated with model validation and yield curve development.

New Policies, Procedures and Guidelines

T&C 27 (c) Clearcut Restrictions

The Forest Management Planning Manual requires the documentation of all planned clearcut areas by size classes, and the provision of a rationale for any clearcut areas that exceed 260 hectares in size, or that do not represent a range of sizes. These new reporting requirements began with the 1996 harvest year which was reported in the following year. Provincial level reports will be included with the 1998 annual report.

T&C #52(e) Water Crossing Removal Criteria Development

A report "Criteria for the Removal of Water Crossings of Abandoned Roads" was produced in April 1996. The report was prepared by a committee of Ministry of Environment, MNR and forest industry representatives, that developed geological, engineering, water quality, and safety criteria for use in determining water crossing removal for roads that are scheduled to be abandoned.

T&C # 94(b) Environmental Guidelines

MNR is required to produce an implementation manual referred to as the "Environmental Guideline for Timber Management Activities". The guideline is required to provide direction in relation to timber harvest layout, configuration and clearcut sizes, and to address the protection of the physical environment in the course of forest harvest, renewal, and maintenance.

MNR's approach to meet this requirement is to develop two separate guidelines that address:

1) protection of the physical environment

2) harvest layout, configuration and clearcut sizes.

A technical team was formed to write the protection of the physical environment guideline. A draft guideline "Forest Management Guidelines for the Protection of the Physical Environment" was available for public review and comment in the of summer 1997.

Background research and analysis into historic fire patterns and emulating natural disturbance patterns is underway in support of the guidelines for harvest layout and configuration. A workshop, involving government and interest group representatives, was held in October 1996 to discuss issues associated with emulating natural disturbance patterns. The proposed title of this second guideline is "The Forest Management Guidelines for the Emulation of Fire Disturbance Patterns".

T&C #94(c) Guidelines for Pine Marten and Pileated Woodpecker Habitat

MNR is required to develop two new guidelines: 1) Forest Management Guidelines for the Provision of Marten Habitat; and 2) Forest Management Guidelines for the Provision of Pileated Woodpecker Habitat.

Both guidelines were released in May 1996 to forest management planning teams. A mass printing and distribution of both guidelines occurred in August 1996. Implementation of guidelines requirements are occurring in accordance with forest management planning requirements.

T&C # 98 Northern Ontario Wetlands Evaluation System

As previously reported in the provincial Annual Report on Forest Management 1995/96, the requirement to develop a Northern Ontario Wetlands Evaluation System has been completed.

The evaluation system was designed to allow a relative ranking of the importance of wetlands based on numerical scores assigned to biological, physical and social attributes. Wetlands that are highly ranked are considered to be of provincial significance and are protected by wetlands policy.

A system for evaluating wetlands in southern Ontario has been in place since 1984. This system was modified for use in northern Ontario. The Ontario Wetland Evaluation System Northern Manual was published in March 1993 with a subsequent revised manual released in May 1994.

T&C #103(a) Old Growth Conservation Strategies

The goal of the strategy is to ensure that old-growth-forest ecosystems are maintained on the landscapes of Ontario now and into the future. The comprehensive strategy will be implemented through ecological land use and forest management planning.

An Old Growth Forest Policy Advisory Committee, established in 1992, released a final report in September 1994 on recommendations for conservation of old growth forests of all species. In May 1993, the advisory committee also released an interim report on conserving old growth red and white pine forests.

MNR released A Conservation Strategy for Old Growth Red and White Pine Ecosystems for Ontario in June 1994. Implementation of this strategy is under way through natural heritage conservation initiatives and through the forest management planning process.

Work is also ongoing on a proposed Conservation Strategy for Old Growth Forest Ecosystems on Crown Lands in Ontario. This policy is to be completed by May 2003.

T&C #106 Roadless Wilderness Areas Policy

In 1995/96, MNR began the development of a policy statement on roadless wilderness areas. Work continued and this policy was completed in May 1997.

T&C #110 District Land Use Guidelines

Recommendations for an improved planning system were released for public review in March 1995. The recommendations were modified based on input from the public, in addition to new direction from MNR's Business Plan.

In February 1997, the Minister of Natural Resources announced Lands for Life, which is a comprehensive land use planning process that integrates

the protection and use of Ontario's natural resources. Round Tables made up of citizens with a diverse range if interests, were established for the three ecologically-based planning regions (Great Lakes-St. Lawrence, Boreal East, and Boreal West). Round Table members sought input from individuals and organizations.

The outcome was a review of land use designations currently outlined in District Land Use Guidelines and a series of new recommendations for permitted uses.

New Forest Management Methods, Models and Tools

T&C #80 Long-Term Scientific Studies and Research

Effects of Timber Management on Tourism Values: This study is designed to assess the effectiveness of the provincial timber management guidelines for the protection of tourism values, and where appropriate, make recommendations for improvements to the guidelines. The study consists of several initiatives.

Development of a Remote Tourism Decision Support System (DSS) is continuing and spatially referenced databases have been developed.

Work is continuing with modelling shoreline aesthetics in the Boreal Forest in Northern Ontario where most recreational use of the forest is water-based. The surrounding forest provides an important scenic backdrop for the recreational experience and the shoreline aesthetics project attempts to understand the aesthetic values that recreationists place on different forest types as well as disturbances on the landscape. Efforts in the third year of this project concentrated on the collection of images and forest descriptions.

Two functional decision support systems were developed after interviews with Sudbury area anglers. The models (one for walleye and one for lake trout) examine the various regulations that could be imposed and the support that anglers would have for those initiatives through choice-based questions. Also, a complex questionnaire was developed to examine the issue of road access and activities permitted on Crown land in the Sudbury area. The questionnaire involves both specific and generic choice based questions that provide an ability to examine trade-offs for various management options for a land base.

Moose Guidelines Evaluation: This project is assessing the effectiveness of Ontario's Timber Management Guidelines for the Provision of Moose Habitat, and will determine the effects of current forest management practices on moose and other wildlife habitat.

Field research continued with the continued collection and spatial analysis of location data for 60 moose using global positioning system (GPS) collars for wildlife research. The world's first GPS wildlife collars were deployed as part of this study on eight free-ranging adult cow moose in the South Wapageisi Lake area of Northwestern Ontario in 1994. These collars provided unprecedented quantity and quality of wildlife location data. Tracking moose locations helps determine how moose use different habitats available to them and the key factors affecting their use.

To date, more than 300,000 records have been downloaded from GPS collars. In late January and early February 1997, GPS collars were recovered, refurbished and redeployed on all 60 moose originally collared.

Data on moose condition (blood & hair, body measurements, etc.) was also collected at the time of refurbishing and recollaring the moose. This data is collected to support ongoing studies of moose condition associated with habitat use.

Work continued on the evaluation and monitoring of moose aquatic feeding areas in the South Wapageisi Lake project study area and at the Coldwater Lakes Experimental Study Site near Atikokan. The main objective of monitoring moose aquatics is to refine the current ranking system and develop a repeatable and quantifiable method of ranking.

Landscape Analysis of Wildlife Habitat: This research program is designed to characterize natural patterns of disturbance across eco-regions, and to determine whether landscape patterns created through logging differ from those created by natural disturbance. Wildlife responses to habitat created by logging will be also measured to determine whether they differ from responses to habitat created by natural disturbance.

In support of this research, spatial data collection, mapping, analysis and decision support tools will also be developed as required to assist in analysing wildlife-forestry interactions and to aid in applying new research knowledge to sustainable forest management planning.

Work in these areas is ongoing. A computer based natural disturbance and analysis planning tool (NDAPT) has been developed.

Aquatic Effects Research: These long-term scientific studies are designed to assess the effectiveness of the provincial Timber Management Guidelines for the Protection of Fish Habitat, with an emphasis on the numerical measurement and modeling of land-use effects on aquatic ecosystems in northern Ontario. To date, aquatic effects research has been addressed through two main projects, the Coldwater Lakes Experimental Watersheds and the Comparative Aquatic Effects Program.

The Coldwater Lakes Research Project was initiated in 1990 to experimentally evaluate the effects of logging on lake ecosystems and to provide information about the effectiveness of shoreline reserves in preventing those effects. This project is part of a larger integrated program that also addresses timber management effects on coolwater lakes and coldwater streams. To detect ecosystem responses, five years of intensive pre-harvest monitoring was accomplished during 1991-95. An experimental harvest took place during 1996-97 which will be followed by five years of post-harvest monitoring (1997-2001).

The Comparative Aquatic Effects Program was begun in 1995 to measure the effects of timber management on aquatic ecosystems in Ontario's boreal forest and to test the effectiveness of current timber management guidelines on preventing or minimizing these effects. To date, the program has focused on measuring timber-harvest effects on coldwater streams. Because coldwater stream habitat is tightly integrated with the surrounding landscape, it is expected to be sensitive to disturbances in the surrounding catchment. The program is investigating a number of areas including the key aquatic habitat variables to monitor the effects of timber harvest, the spatial scale of harvest impacts on aquatic ecosystems, the use of buffer strips to prevent sediment from moving overland and into waterways, and the effects of logging roads as barriers to fish migration.

T&C #101 Full-Tree Harvesting and Long-Term Site Productivity

This study on the effects of full-tree harvest and full-tree chipping on long-term site productivity completed the baseline (before harvest) collection of data and associated chemical analysis.

The experimental harvest has been conducted and activities in 1996/97 concentrated on data collection. Also models to quantify water and litter fall fluxes are being developed.

T&C #102 Tending and Protection Improvement Programs

MNR has a number of ongoing projects related to pest management (insects and diseases) and vegetation management. MNR has either on its own or in partnership with other provinces and the private sector funded a number of research projects.

Pest Management: Funding was provided to the Canadian Forest Service (CFS) to test a naturally occurring insect virus for control of gypsy moth, as an alternative to conventional insecticides. This was part of an on-going research project begun with MNR support in 1982. In 1996, Health Canada registered this product, supported by data from MNR-funded studies. MNR is now working with the CFS to find a company to produce this product commercially.

Funding was provided to the CFS Environmental Impact project to conduct three related studies on Neem, a new botanical insecticide derived from the neem tree. MNR is now discussing with commercial manufacturers the potential for registering Neem for use in Canada.

Funding was provided to the CFS Insect Ecology Project to test a microencapsulation technology in the use of pheromones to control jack pine budworm and European pine shoot moth. 3M Company, which holds the patent on the technology, is a partner.

Vegetation Management Alternatives: Since 1991, the focus of the Vegetation Management Alternatives Program (VMAP) at OFRI has been to reduce dependence on herbicides in Ontario's forests by developing effective, safe, economically viable alternatives, along with a better understanding of forest ecosystems. This has been accomplished through applied and basic research, education, and field delivery.

Fundamental research to advance underlying science that supports vegetation management practices with an emphasis on ecosystems dynamics, biological control and social interfaces is ongoing. Numerous articles and reports have been produced.

One of the goals of the Vegetation Management Alternatives Program is to ensure that the alternatives being developed are environmentally sound. To this end a major study, the Fallingsnow Ecosystem Project, was established in 1993 to evaluate the effects of five alternative conifer-release treatments on the environment in a young spruce plantation located near

Thunder Bay, Ontario. Researchers are comparing the effects of cutting with brushsaws, cutting with a mechanical cleaning machine, and applying herbicides by helicopter, with what happens in untreated control plots and in the adjacent unharvested forest. Data collection and analysis from Fallingsnow Ecosystem Project will continue until 1998, when fifth-year post-treatment results can be reported.

T&C #104 Socio-Economic Analysis

As reported in the 1995/96 Provincial Annual Report, a Socio-Economic Impact Model has been developed by MNR to help in the determination of economic and social impacts of non-timber values and alternative forest management scenarios in forest-management planning. Training on the model is ongoing with forest-management planning teams.

T&C #107 Biodiversity Assessment, Landscape Management and Wildlife Habitat Supply Modeling

The provincial Forest Landscape Ecology Program at OFRI is assessing the effects of natural changes and human activity on the biodiversity and sustainability at the landscape level.

Study groups have been assembled, composed of scientists from MNR, Canadian Forest Service, universities, and the private sector. Databases for all studies were compiled and edited. A CD-ROM package of the Digital Surficial Geology Atlas data of Ontario, plus viewing software, was compiled.

Work is continuing with the development of an Ontario-wide database which includes such themes as land cover, fire history, forest harvest history, and others.

The Landscape Ecological Analysis Package (LEAP, version 1) model and user manual has been completed and is being used in the development of forest management plans. Work is also continuing with the development of a spatial fire model (ON-FIRE) and a digital fire history of Ontario, which will assist in determining disturbance patterns on the landscape as a result of wildfires.

Work is continuing with the investigation and development of wildlife habitat supply modelling. A non-spatial habitat supply model was previously developed as a module in the Strategic Forest Management Model (SFMM) for application at forest management unit to regional level.

T&C #108 Geographic Information Systems

Geographic Information Systems (GIS) are designed to aid in the storage, organization, analysis, and presentation of complex geographic data using computer systems. They are essential for the full development of modern resource management methods, models, and tools.

GIS-capable computers and software were installed in all MNR district and area offices where a new forest management plan was being prepared or reviewed. As well, systems were installed in regional offices, Science Units, Research Units, and Systems Development Units. Systems, software and technical training was provided. Automation of values data for sites that were preparing 1998 forest management plans was underway.

Strategic Forest Management Model

The Strategic Forest Management Model (SFMM) is used to explore forest management strategies and options, and to evaluate potential resource benefits, including available supplies of wood products, areas of potential wildlife habitat, and measures of forest diversity. SFMM is used by MNR to help model and project the development of Ontario's forests through time, in light of natural forest dynamics and the effects of human intervention.

The SFMM can be used to project the future forest condition, forest dynamics, available wood supply, potential wildlife habitat, and forest diversity, through time horizons of approximately 150 years.

The SFMM is used widely by MNR and other resource organizations, including consultants and forest products companies. Within MNR, regional forest analysts and district foresters have developed model formulations for each of Ontario's forest management units. Through hands-on workshops and user support, they are currently transferring this planning tool to forest managers throughout Ontario, for use in forest management planning and other applications.

A user's guide provides detailed information regarding the structure and use of the Strategic Forest Management Model in Ontario.

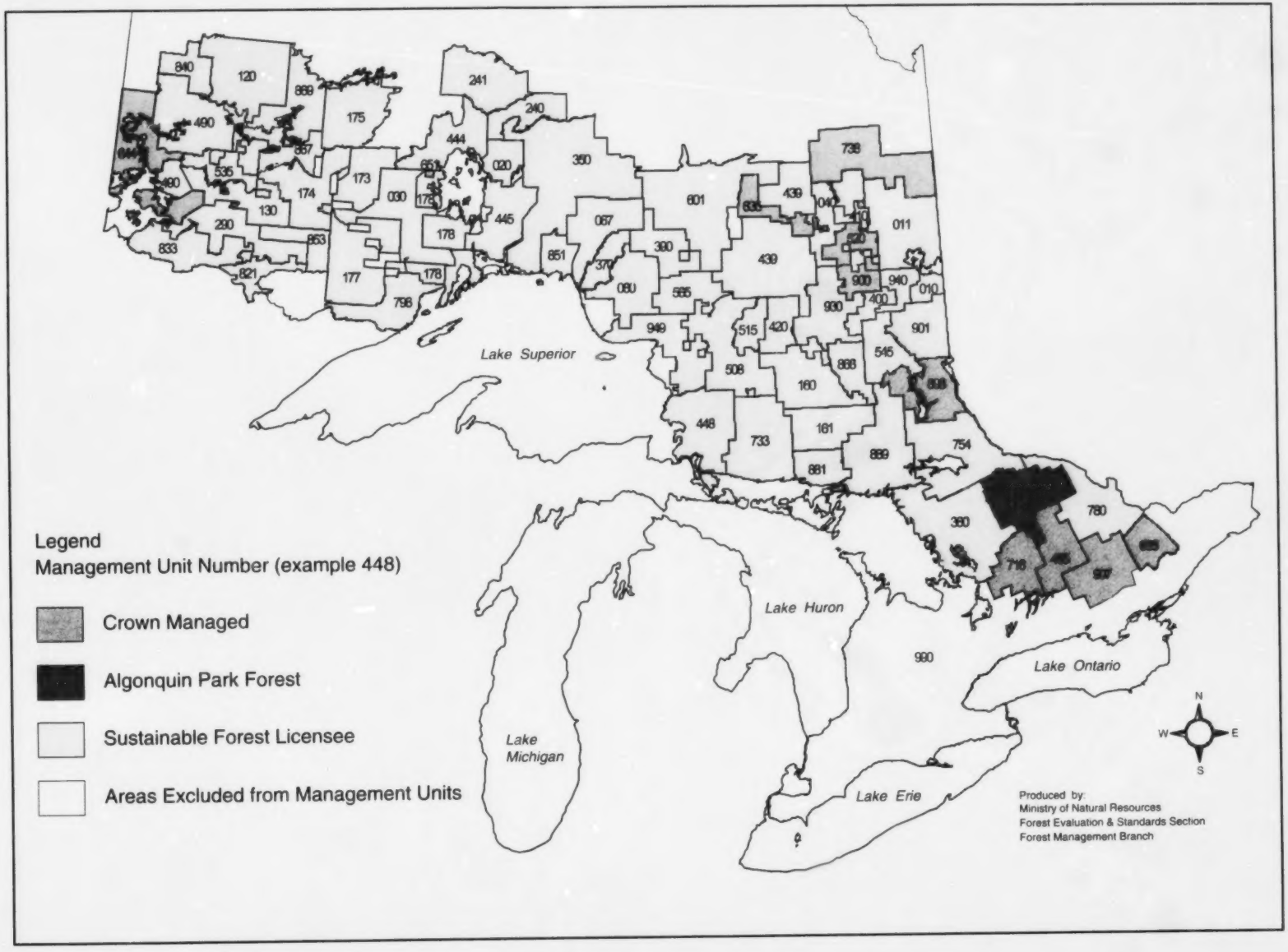
Appendices

Appendix 1
All Land Classifications within Inventoried Area 1996

Total Areas by Land Class (hectares)	By Ownership and Type							By Forest Region		ALL
	Crown Lands					Non-Crown Lands		All Ownerships		
Land Classifications	Regular Crown Forest	Parks and Rec. Reserve & Protection	Outside AOU* Northern Units	Outside AOU* Southern Units	Total	Private Forest	Federal Forest	Boreal Forest	Great Lakes St. Lawrence & Deciduous	Grand Total
Forested Land										
Productive Forest	26,004,850.6	3,584,157.5	4,456,454.7	94,060.0	34,139,522.8	5,764,085.3	398,927.4	29,672,153.3	10,630,382.3	40,302,535.6
Non-Productive Forested Land										
Open Muskeg	691,952.7	83,922.6	96,239.8	11,012.0	883,127.1	189,870.9	17,405.1	676,016.3	414,386.8	1,090,403.1
Treed Muskeg	1,232,211.3	108,981.0	1,035,347.9	656.0	2,377,196.1	136,681.7	11,824.0	2,226,403.2	299,298.7	2,525,701.8
Brush & Alder	846,499.8	46,905.5	172,524.1	5,074.0	1,071,003.4	235,002.5	11,058.1	960,521.5	356,542.4	1,317,063.9
Rock	388,042.1	33,171.9	36,785.1	3,371.0	461,370.1	88,350.1	10,384.0	254,926.8	305,177.4	560,104.2
Sub-total:	3,158,705.8	272,981.0	1,340,896.9	20,113.0	4,792,696.8	649,905.1	50,671.2	4,117,867.8	1,375,405.2	5,493,273.1
Non-Forested Land										
Developed Agricultural Land	4,520.4	889.0	0.0	13,666.0	19,075.4	4,602,433.1	12,545.0	102,125.0	4,531,928.5	4,634,053.5
Grass & Meadow	8,089.2		0.0	7,983.0	16,072.2	966,581.5	5,223.0	34,478.5	954,393.1	987,876.6
Unclassified Land	241,087.9	9,019.9	3,045.0	3,599.0	256,751.8	809,533.8	64,917.0	236,353.7	894,849.0	1,131,202.6
Unsurveyed Land	2,767.0	3,106.0	0.0	0.0	5,873.0	27,719.0	192,624.0	6,386.0	219,830.0	226,216.0
Sub-total:	256,464.4	13,014.9	3,045.0	25,248.0	297,772.3	6,406,267.4	275,309.0	379,343.1	6,601,000.6	6,979,348.7
Water	5,627,304.7	259,103.5	1,138,110.0	1,640,433.0	8,664,951.2	2,110.0	9,129.0	4,946,471.7	3,729,718.5	8,676,190.2
Grand Total:	35,047,325.6	4,129,256.9	6,938,506.6	1,779,854.0	47,894,943.1	12,822,367.9	734,036.6	39,115,835.9	22,336,506.7	61,451,347.6
Relative Percentages										
Forested Land	42.3 %	5.8 %	7.3 %	0.2 %	55.6 %	9.4 %	0.6 %	48.3 %	17.3 %	65.6 %
Non-Productive Forested Land	5.1 %	0.4 %	2.2 %	0.0 %	7.8 %	1.1 %	0.0 %	6.7 %	2.2 %	8.9 %
Non-Forested Land	0.4 %	0.0 %	0.0 %	0.0 %	0.5 %	10.4 %	0.4 %	0.6 %	10.7 %	11.4 %
All Land Classifications	47.9 %	6.3 %	9.4 %	0.2 %	63.8 %	20.9 %	1.2 %	55.6 %	30.3 %	85.9 %
Water	9.2 %	0.4 %	1.9 %	2.7 %	14.1 %	0.0 %	0.0 %	8.0 %	6.1 %	14.1 %
Total	57.0 %	6.7 %	11.3 %	2.9 %	77.9 %	20.9 %	1.2 %	63.7 %	36.3 %	100.0 %

*AOU - Area of Undertaking

Appendix 2
Management Units in Ontario
April 1, 1999



Key to Management Units (April 1, 1999) (designated under the Crown Forest Sustainability Act, Section 7)

MU #	MU Name	Status	Region	MU #	MU Name	Status	Region
448	Algoma Forest	SFL	NE	907	Mazinaw	CR	SC
451	Algonquin Park Forest	AFA	SC	716	Minden	CR	SC
444	Armstrong Forest	SFL	NW	733	Mississagi	SFL	NE
020	Auden Forest	SFL	NW	738	Moose River	CR	NE
465	Bancroft	CR	SC	390	Nagagami Forest	SFL	NE
067	Big Pic Forest	SFL	NE	240	Nakina North Forest	SFL	NW
370	Black River Forest	SFL	NE	754	Nipissing Forest	SFL	NE
178	Black Sturgeon Forest	SFL	NW	241	Ogoki Forest	SFL	NW
173	Brightsand Forest	SFL	NW	780	Ottawa Valley Forest	SFL	SC
175	Caribou Forest	SFL	NW	851	Pic River Ojibway Forest	SFL	NW
520	Cochrane	CR	NE	420	Pineland Forest	SFL	NE
177	Dog River-Matawin Forest	SFL	NW	840	Red Lake Forest	SFL	NW
410	Driftwood Forest	SFL	NE	930	Romeo Malette Forest	SFL	NE
535	Dryden Forest	SFL	NW	853	Sapawe Forest	SFL	NW
545	Elk Lake	SFL	NE	868	Shiningtree Forest	SFL	NE
174	English River Forest	SFL	NW	867	Sioux Lookout Forest	SFL	NW
821	Flanders Forest	SFL	NW	040	Smooth Rock Falls Forest	SFL	NE
833	Fort Frances Forest	SFL	NW	990	Southern Ontario	CR	SC
360	French-Severn Forest	SFL	SC	881	Spanish River	SFL	NE
439	Gordon Cosens Forest	SFL	NE	030	Spruce River Forest	SFL	NW
601	Hearst Forest	SFL	NE	889	Sudbury Forest	SFL	NE
290	Highrock Forest	SFL	NW	508	Superior Forest	SFL	NE
011	Iroquois Falls Forest	SFL	NE	898	Temagami	CR	NE
010	Iroquois Falls South	SFL	NE	901	Timiskaming	SFL	NE
515	J.E. Martel Forest	SFL	NE	900	Timmins	CR	NE
635	Kapuskasing	CR	NE	400	Timmins Forest	SFL	NE
350	Kenogami Forest	SFL	NW	120	Trout Lake Forest	SFL	NW
644	Kenora	CR	NW	160	Upper Spanish Forest	SFL	NE
651	Kiashke River	CR	NW	130	Wabigoon Forest	SFL	NW
869	Lac Seul Forest	SFL	NW	940	Watabeag	SFL	NE
445	Lake Nipigon Forest	SFL	NW	949	Wawa Forest	SFL	NE
796	Lakehead Forest	SFL	NW	490	Whiskey Jack Forest	SFL	NW
688	Lanark	CR	SC	060	White River Forest	SFL	NE
161	Lower Spanish Forest	SFL	NE				
565	Magpie Forest	SFL	NE				

Status	Forest Management Planning Responsibility:
SFL	Sustainable Forest Licence
CR	Crown
AFA	Algonquin Forest Authority

Appendix 3
Forest Management Plans Approved for Implementation in 1996, 1997, 1998 and 1999, Plans Scheduled for Approval and Implementation in 2000, 2001 and 2002

Forest Management Plans Approved for Implementation in 1996/97

Management Unit Name	MU#	Lead District	Remarks
Auden	020	Nipigon	1 year contingency plan, renamed Auden Forest – April 1997
Bancroft	465	Bancroft	Formerly Bancroft and Whitney
Black River Forest	370	Wawa	
Black Sturgeon Forest	178	Nipigon	
Dryden	535	Dryden	1 year contingency plan, renamed Dryden Forest – April 1998
Elk Lake	545	Kirkland Lake	
Fort Frances	833	Fort Frances	Renamed Fort Frances Forest – April 1997
Iroquois Falls South	010	Cochrane	
Kenora	644	Kenora	1 year contingency plan
Lake Nipigon Forest	445	Nipigon	
Lower Spanish Forest	161	Sudbury	
Mazinaw	907	Bancroft	Formerly Tweed
Minden	716	Bancroft	Formerly Minden and Leslie Frost Centre
Nipigon	625	Thunder Bay	2 year contingency plan, Part of Lakehead Forest MU# 796 – April 1998
Pembroke	780	Pembroke	Formerly Bonnechere and Madawaska, renamed Ottawa Valley Forest – April 1999
Red Lake	840	Red Lake	2 year contingency plan, renamed Red Lake Forest – April 1999
Shiningtree	868	Timmins	Renamed Shiningtree Forest – April 1998
Sioux Lookout	875	Sioux Lookout	Part of Sioux Lookout Forest MU# 867 as of – April 1998
Spanish River	881	Sault Ste. Marie	
Spruce River Forest	030	Thunder Bay	
Steel River	851	Nipigon	Renamed Pic River-Ojibway Forest – April 1998
Sudbury	889	Sudbury	Formerly Wanapitei, Trout Lake and Killarney, renamed Sudbury Forest – April 1998

continued next page

96/97 continued

Management Unit Name	MU#	District	Remarks
Temagami	898	North Bay	1 year contingency plan, formerly Temagami and Latchford
Timmins	900	Timmins	
Upper Spanish Forest	160	Sudbury	

Forest Management Plans Approved for Implementation in 1997/98

Management Unit Name	MU#	Lead District	Remarks
Auden Forest	020	Nipigon	
Big Pic Forest	067	Wawa	
Caribou Forest	175	Sioux Lookout	Formerly Caribou West and part Caribou East
Dryden	535	Dryden	Renamed Dryden Forest April 1998
Hearst Forest	601	Hearst	
Highrock Forest	290	Fort Frances	Formerly Manitou and Seine River Forests
J.E. Martel Forest	515	Chapleau	
Kenora	644	Kenora	
Lac Seul Forest	869	Sioux Lookout	
Lakehead Forest	796	Thunder Bay	Formerly Port Arthur and Thunder Bay
Nagagami Forest	390	Wawa	
Nakina North Forest	240	Nipigon	
Ogoki Forest	241	Nipigon	
Pineland Forest	420	Chapleau	
Romeo Malette Forest	930	Timmins	
Superior Forest	508	Chapleau	
Temagami	898	North Bay	2 year contingency plan
Timiskaming	901	Kirkland Lake	Formerly Timiskaming and W.L.Plonski

Forest Management Plans Approved for Implementation in 1998/99

Management Unit Name	MU#	Lead District	Remarks
Cochrane	520	Cochrane	
Driftwood Forest	410	Cochrane	
Lanark	688	Kemptville	1 year contingency plan
Moose River	738	Cochrane	
Red Lake	840	Red Lake	Renamed Red Lake Forest – April 1999
Timmins Forest	400	Timmins	
Wabigoon Forest	130	Dryden	
White River Forest	060	Wawa	

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Forest Management Plans Approved for Implementation in 1999/00

Management Unit Name	MU#	Lead District	Remarks
Brightsand Forest	173	Thunder Bay	
Elk Lake	545	Kirkland Lake	2 year contingency plan
French-Severn Forest	360	Parry Sound	Formerly Bracebridge and Parry Sound
Kapuskasing	635	Hearst	
Lanark	688	Kemptville	2 year contingency plan
Magpie Forest	565	Wawa	
Nipissing Forest	754	North Bay	Formerly North Bay
Temagami	898	North Bay	
Trout Lake Forest	120	Red Lake	
Upper Spanish Forest	160	Chapleau	1 year contingency plan
Watabeag	940	Kirkland Lake	
Whiskey Jack Forest	490	Kenora	Formerly Patricia Forest and Pakwash Forest

Plans Scheduled for Approval and Implementation in 2000

Management Unit Name (current or proposed)	MU#	Lead District	Remarks
Algoma Forest	448	Sault Ste. Marie	
Algonquin Park Forest	451	Algonquin Park	
Armstrong Forest	444	Thunder Bay	
Dog River-Matawin Forest	177	Thunder Bay	
English River Forest	174	Dryden	
Fort Frances-Flanders Forest	827	Fort Frances	Fort Frances Forest (833) and Flanders Forest (821) to be amalgamated
Gordon Cosens Forest	438	Hearst	Gordon Cosens Forest (439) and Kapuskasing (635) to be amalgamated
Iroquois Falls Forest	012	Cochrane	Iroquois Falls Forest (011) and Iroquois Falls South (010) to be amalgamated
Kenogami Forest	350	Nipigon	Formerly Longlac Forest, Nakina Forest and Geraldton
Northshore Forest	680	Sault Ste. Marie	Mississagi (733) and Spanish River (881) to be amalgamated
Sapawe Forest	853	Fort Frances	
Smooth Rock Falls Forest	040	Cochrane	
Spanish Forest	210	Sudbury	Upper Spanish Forest (160) and Lower Spanish Forest (161) to be amalgamated

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Management Unit Name	MU#	Lead District	Remarks
Sudbury Forest	889	Sudbury	
Wawa Forest	949	Wawa	

Plans Under Preparation for Approval and Implementation in April 2001 (early renewal information noted)

Management Unit Name (current or proposed)	MU#	Lead District	Remarks
Bancroft-Minden Forest	465/716	Bancroft	Bancroft and Minden to be amalgamated
Black River Forest	370	Wawa	
Black Sturgeon Forest	178	Nipigon	scheduled for early approval
Dryden Forest	535	Dryden	early renewal by one year
Hearst Forest	601	Hearst	scheduled for early approval
Pineland-Martel Forest	515/420	Chapleau	early renewal by one year, J. E. Martel Forest and Pineland Forest to be amalgamated
Kenora	644	Kenora	
Lac Seul Forest	869/867	Sioux Lookout	Lac Seul Forest and Sioux Lookout Forest to be amalgamated
Lake Nipigon Forest	445/020	Nipigon	Lake Nipigon Forest and Auden Forest to be amalgamated
Mazinaw-Lanark Forest	907/688	Bancroft	Mazinaw and Lanark to be amalgamated
Nagagami Forest	390	Wawa	early renewal by one year
Ottawa Valley Forest	780	Pembroke	formerly Pembroke
Pic River Ojibway Forest	851	Nipigon	formerly Steel River, scheduled for early approval
Romeo Malette Forest	930	Timmins	early renewal by one year
Shiningtree Forest	868	Timmins	
Spruce River Forest	030	Thunder Bay	scheduled for early approval
Superior Forest	508	Chapleau	early renewal by one year
Timiskaming Forest	545/901/940	Kirkland Lake	Elk Lake, Timiskaming, and Watabeag to be amalgamated
Timmins	900	Timmins	

Plans Commencing Preparation in 2000 for Approval and Implementation in 2002			
Management Unit Name (current or proposed)	**MU#**	**Lead District**	**Invitation to Participate – Tentative Date and Remarks**
Big Pic Forest	067	Wawa	March 2000
Caribou Forest	175	Sioux Lookout	February 2000
Crossroute Forest	290/827	Fort Frances	March 8, 1999 (planning process initiated early, Highrock Forest and Fort Frances-Flanders Forest to be amalgamated
Lakehead Forest	796	Thunder Bay	February 2000

Appendix 4
Forest-dependent Communities (ranked by percentage of forestry workers)

Census subdivision	Type	1991 Population	Labour Force	Forestry Workers	% Forestry
Dubreuilville	Township	985	895	740	83%
Red Rock	Township	1,420	1,230	840	68%
Barrie Island	Township	75	30	20	67%
Longlac	Town	2,075	1,675	1,070	64%
Terrace Bay	Township	2,480	1,910	1,215	64%
James	Township	525	380	240	63%
Field	Township	680	405	240	59%
Opasatika	Township	390	225	130	58%
Dorion	Township	510	340	190	56%
Smooth Rock Falls	Town	2,040	1,260	690	55%
Airy	Township	820	485	270	56%
Constance Lake 92	Reserve	515	185	100	54%
Mattice-Val Cote	Township	1,015	490	260	53%
Iroquois Falls	Township	5,985	3,760	1,945	52%
Nipigon	Township	2,335	1,545	765	50%
Worthington	Township	110	40	20	50%
White River	Township	950	705	345	49%
Aroland	Reserve	290	105	50	48%
Nairn	Township	430	270	130	48%
Val Rita-Harty	Township	1,175	775	370	48%
Moonbeam	Township	1,305	725	340	47%
Espanola	Town	5,525	3,535	1,575	45%
Faquier-Strickland	Township	745	390	175	45%
Calvin	Township	575	310	135	44%
Cameron	Imp. District	150	80	35	44%
Hearst	Town	6,045	4,095	1,775	43%
Kapuskasing	Town	10,325	6,385	2,665	42%
Barclay	Township	1460	1,200	480	40%
Mattagami 71	Reserve	140	75	30	40%
Brudenell and Lyndoch	Township	775	375	145	39%
Carlow	Township	420	180	70	39%
Raglan	Township	840	370	145	39%
Cochrane	Unorganized	3,835	2,150	820	38%
Dilke	Township	160	130	50	38%
Ear Falls	Township	1,295	850	325	38%

Census subdivision	Type	1991 Population	Labour Force	Forestry Workers	% Forestry
Mattawa	Town	2,455	1,345	495	37%
Baldwin	Township	695	430	155	36%
Glakmeyer	Township	1,065	645	235	36%
Rainy River	Unorganized	1,420	975	355	36%
Sherwood	Township	2,100	1,060	380	36%
Thessalon	Town	1,540	855	305	36%
Dryden	Town	6,475	4,115	1,465	35%
Nakina	Township	625	385	135	35%
Armstrong	Township	1,395	735	250	34%
Atikokan	Township	4,045	2,420	815	34%
Dack	Township	475	295	100	34%
Joly	Township	250	115	40	34%
Monouth	Township	910	440	150	34%
Spanish River	Township	1,635	960	330	34%
Alberton	Township	920	520	170	33%
Chapleau	Township	3,075	1,960	660	33%
Slate Falls	Reserve	75	30	10	33%
Webbwood	Town	590	285	95	33%

Source: Statistics Canada 1991 Census